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ABSTRACT

Ten papers and four abstracts of papers from the University of South Africa's Conference on Distance Education are presented. They include: "Access to Higher Education and Training in the South Pacific: The Role of Telecommunications and Distance Education" (Som Naidu); "Distance Education in Japan" (Takashi Sakamoto); "The University for Distance Education in Colombia: An Alternative Form of Education" (Linda Gladys Behaine de Cendales); "Development of Distance Education in Sri Lanka" (Dayantha Wijeyesekera); "Distance Education in India: Application of Modern Technology" (K.K. Sud); "The Teaching of Life Sciences at Everyman's University" (Ruth Arav); "Distance Teaching as an Integral Part of the In-Service Education of Mathematics, Physical Science and Biology Teachers" (Jan Nel, Dave Finnemore, Steve Rhodes); "UNISA's Documentation Section" (B.J. van der Walt); "Interactive Multi-media Learning: A Business Case Study in Distance Learning" (abstract only, R.C. Johnson); "Distance Learning: The South African Air Force Experience" (Neville Parkins); "Text Design in Distance Education: Print and Facilitating Adult Education" (abstract only, John Aitchison): "Distance Education in Developing Countries: The Indian Scene" (abstract only, B.S. Jain); "Distance Education and the Educator's Regime of Literacy" (abstract only, John Aitchison); and "Review of the Goals, Methods, Accountability and Future Planning of the Department of Library and Information Science of the University of South Africa" (Anna Louw). (LB)

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PAPERS 7

ED293406

Late Submissions

DISTANCE EDUCATION IN
SOUTHERN AFRICA:
PREPARING FOR THE 21ST CENTURY

18 - 21 MAY 1987

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PREFACE

This is Volume 7 of the papers to be presented at the University of South Africa's Conference on Distance Education, and includes all but four of the papers which have been submitted late. The last four papers will be ready for distribution to participants and delegates early on Tuesday 19 May (as an addition to Volume 7).

David Adey
Conference Manager

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KEY

* An abstract in the Stop Press edition
(N) No abstract printed
(A) Abstract only: paper to be distributed at the Conference
(–) Unable to attend

PAPERS

ACCESS TO HIGHER EDUCATION AND TRAINING IN THE SOUTH PACIFIC

THE ROLE OF TELECOMMUNICATIONS AND DISTANCE EDUCATION

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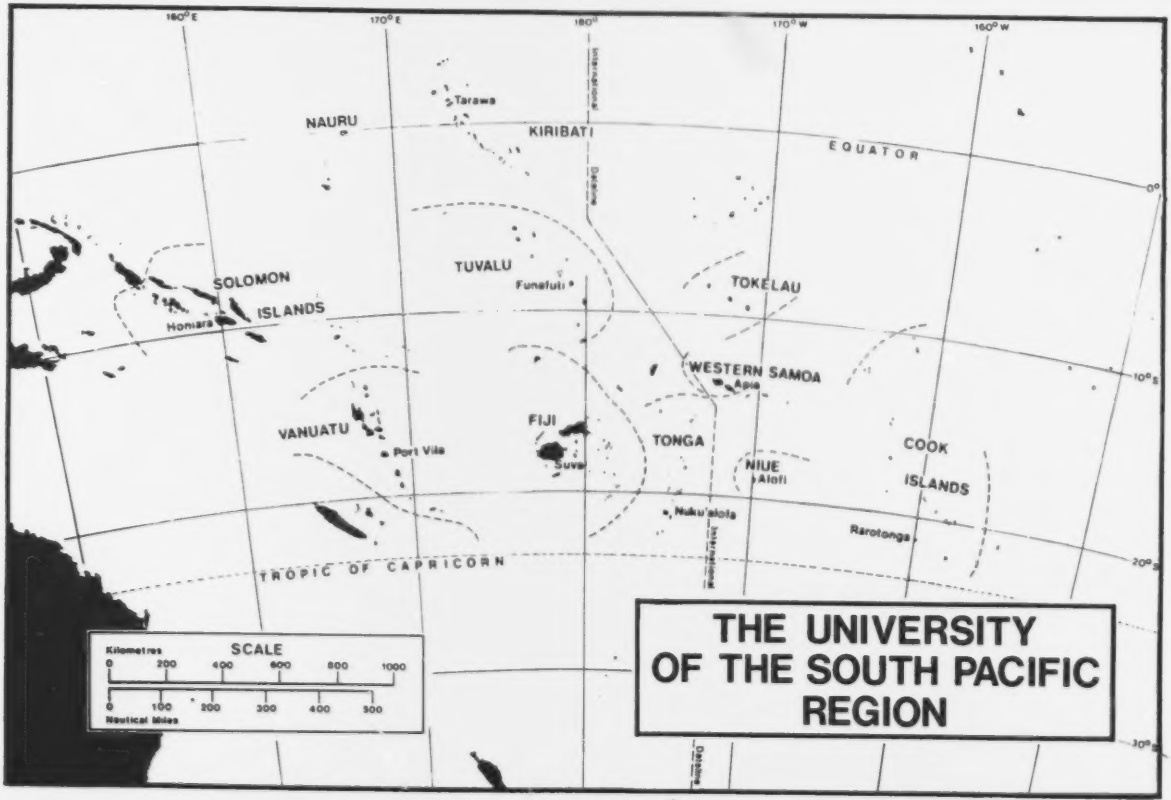
4th April 1987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Nautical Miles
THE UNIVERSITY
OF THE SOUTH PACIFIC
REGION

The South Pacific region : an overview

Whereas the South Pacific region incorporates all of the Pacific ocean below the equator from Australia in the West to South America in the East, in this paper we are concerned with the South West of this region only and that too excluding Australia, New Zealand, Papua New Guinea and New Caledonia. This would then leave us with a region that is serviced by the University of the South Pacific extending from the Solomon Islands in the West to Kiribati in the North and Cook Islands in the East. With the Fiji Islands and Tonga at the base of this semi-circle we are looking at a region much larger than Australia but with a total land area about the size of Tasmania. Other countries in the region include Niue, the Tokelau Islands, Tuvalu, Vanuatu, Western Samoa and Nauru [see map of the USP region on the previous page].

All of these countries except the Tokelaus, are politically independent nations. The Tokelau Islands is a protectorate of New Zealand, administered through Western Samoa. Except for Nauru, which is blessed with phosphate deposits, all the other countries of the region can be described as poor in monetary terms. The main sources of income for most countries are copra, fish, tourism and in the case of the Fiji Islands--cane sugar. Foreign aid therefore of various kinds provides an essential supplementary source of income. Communications and transport facilities within the region are equally poor. While some of the difficulties with communications are related to the vast

distances between the numerous islands and small populations on them, money and technical knowhow to maintain these services pose the greatest difficulty. Smallness, distances and money also determine the islander's access to formal education and training. In most instances access to formal education is solely determined by the facilities governments of the countries can make available to their citizens.

Trends in higher education and manpower training in the region

Formal education was introduced in the Pacific by the first Christian missionaries. These initial efforts were aimed at, inter alia, teaching Pacific Islanders the very basic skills of reading and writing. As the colonial infrastructure expanded it became necessary for the islanders to improve their skills in various ways in order to be able to cope with and benefit from, among other things, a European colonial administration. There was some facility for such training and schooling of the islanders in the colonies, as well as abroad in the home country for a select few.

After several more years of colonial rule, Pacific island nations gradually assumed responsibility for their own affairs and as they did so their need for higher education and training in various fields became even more important. While there was for the islander still some opportunity remaining for such training

abroad, facilities for this locally were slowly being enhanced. The governments of the region were the largest providers of a variety of such facilities. They were assisted in this in several ways by religious organisations, voluntary welfare groups and committees of various denominations. Efforts in this regard have continued to increase and improve over the years to the extent that some countries in the region such as the Fiji Islands are currently able to boast the existence of comparatively large education and training infrastructures. In addition to these the region is also served by a number of regional institutions which cater for the needs of participating countries. Among these is the University of the South Pacific.

The role of the University of the South Pacific

The University of the South Pacific is a regional university and in that regard quite a successful one too. It was established in 1967 following the reports of Sir Charles Morris (Morris Report 1966) and Sir Norman Alexander (the Alexander Report 1967). The first students to the University were admitted in February 1968. The Royal Charter of the University, granted to it on 10 February 1970 defined the objects of the university as being

> the maintenance, advancement and dissemination of knowledge by teaching, consultancy and research and otherwise and the provision at appropriate levels of education and training responsive to the well-being and needs of the communities of the South Pacific.

Thus the University was to have a regional role. Its immediate responsibility would be the South Pacific countries associated by name with the University Charter, but it would aim to establish close associations with other countries in and outside the South Pacific region as well. Within this context the University was to be responsible for building bridges i.e. making higher education and training opportunities accessible to the communities of the South Pacific.

How was the University going to achieve this? This was the question that Sir Norman Alexander was commissioned to address. It was obvious that in view of the geographical spread of the University region and the resources available that all its people desirous of higher education wouldn't be able to receive it if the University was to confine its activities to on-campus face-to-face teaching only. It was imperative from the start therefore, that the University must attempt to reach out into the communities it was to serve. The Morris Report had recommended this effort and the Alexander Report strongly endorsed it suggesting that extra-mural studies form part of the University's teaching effort. The 1968 Programme Planning Committee allocated the administration of the extra-mural teaching functions of the University, initially, to the former School of Education where it remained until becoming part of the responsibility of the separate department of Extension Services.

The regional Centres network

The first Vice Chancellor of the University in his introductory remarks to the University's first development plan had expressed the view that

> the University of the South Pacific was a regional university and it could be healthy and successful only to the extent that it served and justified the support of the countries of the region. The services we could offer in higher education to the countries of the region would be much enhanced by the setting up of University regional Centres.
>
> [Aikman 1970,1]

Through a grant from the Carnegie Corporation of New York local Centres of the University were therefore progressively established in each of the member countries of the University. In one of these countries there is now a sub-centre facility as well and there are plans for the establishment of more sub-centres as the need for access to University resources increases in the countries. In essence, each of the local Centers are extensions of the University infrastructure into the far corners of the University Region. Their main functions, among other things, are to :

- represent the University of the South Pacific in the member country and as such serve as a source of information about its scope, functions and activities ;

- service the University's distance teaching programme ; and
- organise any other activities including continuing and non-formal education services of the University in the member country.

Each Centre has a permanent structure and a team of administrative staff. Each is headed by a director who enjoys academic status. The regional Centres network is co-ordinated by the directorate of the Extension Services.

The Extension Services of the University of the South Pacific

The Extension Services Department is the section of the University that is responsible for most of USP's outreach functions. The headquarters are located at the Laucala Bay Campus from where it makes the various services/resources of the University accessible to all members of the USP community. Extension Services activities can be described as mainly incorporating :

1. distance teaching activity which is the offering of the University's credit courses/programmes to distance learners in the member countries of the University region; and
2. continuing education activity which is the provision of non-credit programmes in the member countries of the USP region.

Distance [Extension] teaching

at the University of the South Pacific

Next to on-campus face-to-face teaching in the traditional manner, distance teaching is the most significant way in which the University makes its services and resources accessible to as many members of the University community as possible. The main objective of this initiative is to enable those unable to attend full-time on-campus tuition either for financial or other reasons, undertake University studies at home while in their jobs. From a very modest start in 1971, the distance teaching services of the University rapidly grew to comprise a major function of the USP. As a method of teaching, it was innovative and challenging for staff involved and ensured a more equitable distribution of the University's resources amongst a much wider cross-section of the University community.

The first efforts

The first credit courses in the distance mode were offered in semester 1 of 1971. These were first efforts and as such course materials often comprised little more than printed lecture notes, textbooks and mailing assignments. Semester 1, 1971 began with six courses from the University's pre-degree programmes and 154 students. Table 1 [on the following page] shows the developments through the rest of the 1970s. By the middle of that decade the total number of courses on offer had doubled and the total number of students enrolled had increased fourfold. In 1976 the distance

TABLE 1

USP EXTENSION STUDIES COURSES AND COURSE ENROLLMENTS: 1971 - 80*

	1971		1972		1973		1974 Semester I only		1974-75 Sept 74 Sept 75		1975-76** Sept 75 Apr 76		1976 Semester II		1977+		1978+		1979+		1980+	
	PreD	Deg	PreD	Deg	PreD	Deg	PreD	Deg	PreD	Deg	PreD	Deg	PreD	Deg	PreD	Deg	PreD	Deg	PreD	Deg	PreD	Deg
Total course enrollments by levels	154	-	355	-	456	-	135	-	461	-	442	97	415	89	544	157	692	172	765	237	814	445
Total yearly enrollments	154		355		456		135		461		539		504		701		864		1002		1259	
Total number of courses by levels	6	-	6	-	9	-	10	-	12	-	12	-	12	3	21	5	27	8	29	8	28	14
Total number of courses	6		6		9		10		12		12		15		26		35		37		42	

* These figures represent course enrollments, not the actual number of students at the time. (25% of students were enrolled in 2 courses)

\+ Enrollment figures for 1977-1980 represent the mean of Semester I and II enrollments.

** The two semester system was implemented in 1976 when the first degree courses were made available to extension students.

PreD Enrollments in Pre-degree courses (Preliminary, Foundation and Vocational)

Deg Enrollments in Degree courses.

studies credit course programme began under the auspices of an Extension Studies Unit within the Extension Services. In that year also the semester system was introduced into the University's distance studies programme and the first degree-level courses were offered in the distance mode. 1977 saw a significant rise in the total number of courses offered compared with previous years. 1980 saw yet another significant increase in the number of courses offered by which time course enrollment had gone beyond the one thousand mark.

The end of the '70s -- consolidating the early efforts

The contribution of the University's distance teaching efforts towards making higher education and training opportunities as accessible as possible in the region was so significant that the end of the decade saw an enhancement of these efforts further. For example, the University's incoming second Vice Chancellor in a statement to the University community remarked that :

> central to the regional character of the University is an upgrading of our Extension Services and a strengthening of the University's outreach by deliberately redeploying some of our resources to this end. Through the Centres of the University we would hope to provide the services we are planning and in this sense the Centers are viewed as channels. In addition the Centres will be expected to develop other local offerings in response to the particular needs of

the smaller communities they serve.

[Maraj 1975, 12-13]

A tenth anniversary review of the University's operations also recommended a strong regional thrust for the University. It suggested that

> heavy emphasis be placed upon the growth of the Extension [distance] studies programmes thus enabling more people to qualify for entry to university studies or to pursue such study without leaving home and job or family.

[Springer et al. 1979, 8]

Following these recommendations the Extension Services operations of the University underwent some restructuring. This included the appointment of senior academic staff with specialist skills in instructional materials design and communications technology to help develop suitable study materials for distance learning.

The 1980s -- a period of further progress

The onset of the 1980s brought with it further progress and developments in the distance teaching operations of the University. As Table 2 [on the following page] shows, total course enrollment in 1981 almost doubled, to nearly two thousand from a little over one thousand in the year before. Degree enrollment particularly, experienced a significant rise. In 1983 a total of 67 courses were on offer in this mode which included

TABLE 2

USP EXTENSION STUDIES COURSES AND COURSE ENROLLMENTS : 1981 - 87*

	1981		1982		1983		1984		1985		1986		1987	
	PreD	Deg	PreD	Deg	PreD	Deg	PreD	Deg	PreD	Deg	PreD	Deg	PreD	Deg
Total course+ enrollments by levels	1167	790	1507	703	1337	1045	1620	1201	1628	1612	1895	1650	NA	
Total yearly+ enrollments	1957		2210		2382		2821		3240		3545		NA	
Total number of courses by levels	34	14	38	11	47	20	46	24	54	31	59	45	66	59
Total number of courses	46		49		67		70		85		104		125	

* Enrollment figures represent course enrollments, not the actual number of students at the time.

\+ Enrollment figures represent the mean for Semester I and II enrollments.

PreD Enrollments in Pre-degree courses (Preliminary, Foundation, Vocational)

Deg Enrollments in Degree courses.

20 at the degree level. In 1987 a total of 125 courses were on offer, 59 at the degree level and 66 at the pre-degree level. A further progressive development around this time was the increase of "vocational" certificates and diploma programmes. In 1987 the following vocational programmes were on offer totally [T] or partially [P] in the distance mode :

.Certificate in teaching English as a second language, [P]

.Certificate and diploma in Accounting Studies, [T]

.Certificate and diploma in Applied Computing, [P]

.Certificate and diploma in Administrative Studies, [T]

.Diploma in Applied Statistics and Data Processing, [P]

.Diploma in Educational Administration, [T]

.Certificate and diploma in Legal Studies, [T]

.Certificate in Librarianship, [T]

.Certificate in Pacific Language Studies, [T]

.Certificate and diploma in Community Development, [P]

.Diploma in Agri-Business, [P]

.Diploma in Health Administration, [P] and

.Certificate in Journalism. [P]

The offer of such vocational programmes arose out of the realisation that not all prospective students in the region wished to undertake full degree level studies. Moreover, programmes at this level provided students who had been away from the formal learning environment for too long with a manageable stepping stone to higher level studies. Judging by their

popularity, their contribution to the University's outreach effort has been very significant.

Teaching at a distance

The distance teaching function of the University is the responsibility of the teaching departments in the four Schools of the University. Essentially, teaching at a distance is the offering of credit courses of the various teaching departments in the distance mode. This incorporates the lecturer or lecturers in-charge of courses, in association with other specialist personnel, preparing for their courses, appropriate instructional materials including printed, audio and/or video components for students to study that course at a distance. These materials are designed to be self-instructional and intended to replace the need for the lecturer "in person".

The initiative to offer a particular course in the distance mode usually originates in the teaching departments. All teaching departments and indeed all their teaching staff are required by University regulations to contribute to teaching and research in as many modes as the University's policies require them to function in. Once a teaching department has decided that it wishes to offer a course in the distance mode it approaches the Extension Services. Based on its own resources to service the development of the study materials for the new course Extension Services makes arrangements to accommodate the new initiative.

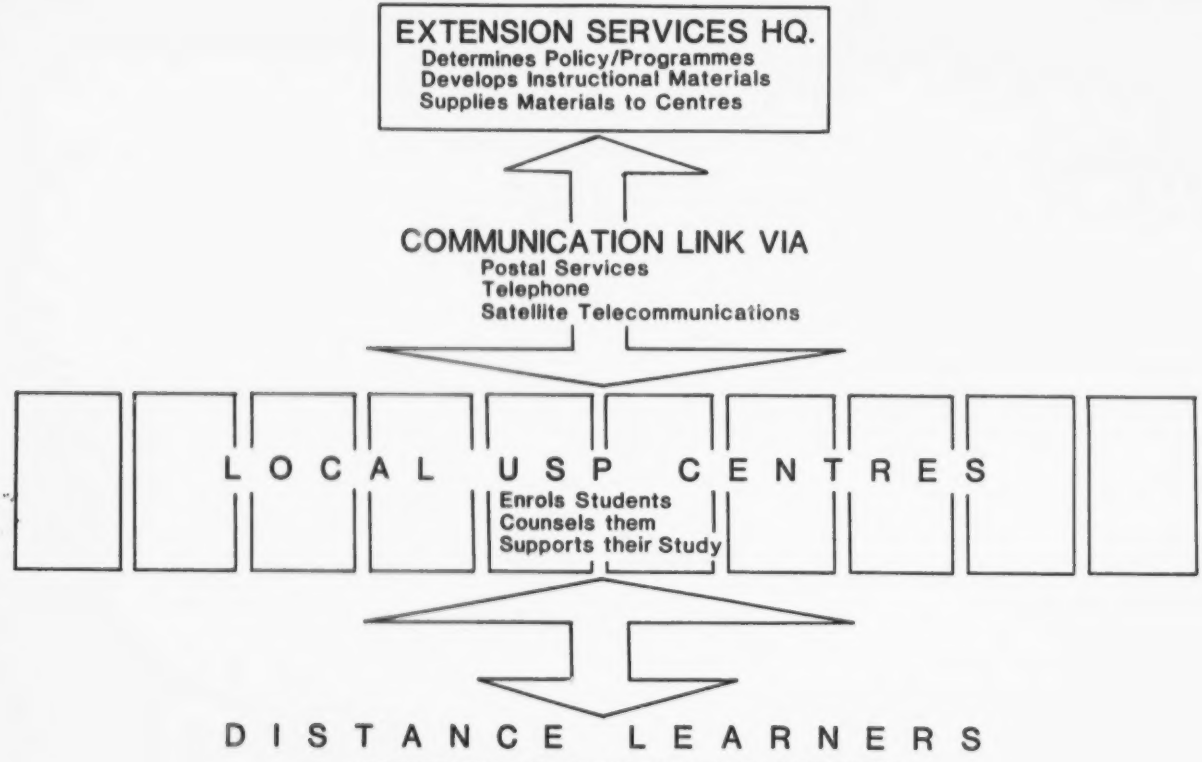
Of course the Extension Services, based upon requests made to it from the region, may itself urge teaching departments to offer particular courses in the distance mode or as summer school courses.

The instructional materials development process

As teaching departments and Institutes are rarely able to release staff from their on-campus duties, the instructional materials development process is usually not as satisfactory as one would have preferred it to be. The principal performers in the instructional materials development process usually include the teaching staff member[s] responsible for the course on-campus and an instructional designer from the Extension Services. Sometimes the teaching departments may support a team effort of more than one course writer. This team would then set out to develop all the course materials for the course.

Studying at a distance

A course is ready for offer for distance study as soon as all the course materials for it are developed printed and despatched. The developers of the course materials may then take a back seat and watch the course run. Students from various parts of the region would enrol to study the course through the local Centres of the Extension Services. Here there exists a complex infrastructure in the form of a student support system to facilitate effective independent study [see diagram on the following page].


EXTENSION SERVICES HQ.
Determines Policy/Programmes
Develops Instructional Materials
Supplies Materials to Centres
COMMUNICATION LINK VIA
Postal Services
Telephone
Satellite Telecommunications
L O C A L U S P C E N T R E S
Enrols Students
Counsels them
Supports their Study
D I S T A N C E L E A R N E R S
INDEPENDENT LEARNERS WHO ARE SUPPORTED
IN THEIR STUDIES BY LOCAL AND TELE-TUTORIALS
ARRANGED BY THEIR LOCAL CENTRES

In studying at a distance, it is therefore not true that students are left entirely on their own to work through their course materials and merely submit the required work for assessment. A distance learner works in close association with his nearest local USP Centre. The Centre has, inter alia, the responsibility of appropriately counselling and enrolling the student, servicing his study programme and providing him with all the necessary support services and encouragement. A Centre may, and very often does, arrange various forms of local tutorial assistance for its students as well. Sometimes marking and grading of students' work also take place at the local Centre although this function remains the overall responsibility of the teaching departments and their staff.

Other university outreach activities

Distance teaching activity clearly comprises a major part of the University's outreach operations but there are also several other significant ways by which the University makes itself accessible in the region. One of these is the Continuing Education activities of the Extension Services. This comprises all activities organised and offered by the Extension Services Department of the University that does not lead to a credit in one of the regular programmes of the University. It includes activities and programmes like :

. workshops/seminars/conferences on a variety of socio-economic concerns affecting the

region e.g. nutrition and health education etc.

- creative dancing, drama, art and writing etc. and
- pre-school teacher's training in which currently a Certificate level study is possible.

Another significant way in which the University extends its resources into the region is through the work of its Institutes some of which are physically based in different countries of the region. These include :

- .The Institute of Education, Laucala Campus, Fiji Islands,
- .The Institute of Marine Resources, Laucala Campus,
- .The Institute of Natural Resources, Laucala Campus,
- .The Institute of Pacific Studies, Laucala Campus,
- .The Institute of Social and Administrative Studies, Laucala Campus,
- .The Institute of Research, Extension and Training in Agriculture, Alafua Campus, Western Samoa,
- .The Institute of Rural Development, Tonga,
- .The Atoll Research Unit, Kiribati,
- .The Pacific Languages Unit, Vanuatu, and
- .The Pacific Law Unit, Vanuatu.

Whereas the teaching departments within the four schools of the University concern themselves primarily with the teaching of the

University's credit programmes, the Institutes of the University concentrate primarily on research activity and the provision of consultancy services and performing only some teaching activity in their respective areas. For example, the work schedule of the Institute of Social and Administrative Studies largely comprises the organisation and offer of short-term training programmes, seminars and workshops for regional persons. As appropriate its work incorporates consultancy services as well. Staff of this Institute also contribute to some teaching in appropriate departments in the School of Social and Economic Development with which it has its closest association. This pattern is likely to be characteristic of the work programme of all the Institutes although some do differ in their orientation in certain ways. For example, the Institute of Pacific Studies concentrates heavily on facilitating publication of the work of regional persons and the two PLUs [The Pacific Languages Unit and The Pacific Law Unit] concentrate more on teaching the University's credit programmes in their respective areas. All these outreach efforts of the University including distance teaching activity are supported in a variety of ways by a satellite telecommunications network facility.

USP's satellite telecommunications facility

When in 1971 the United States National Aeronautics and Space Administration [NASA] offered its Applications Technology Satellite [ATS-1] for free use to the peoples of the Pacific

Basin in their socio-economic development USP was one of the first institutions to take up their offer. The potential benefit of the medium to the work of the University and specifically to its outreach effort was so promising that in 1973 USP applied to NASA for its own time on the satellite. Hence in 1974 the USP network [USPNET] was established which by 1977 enjoyed 24 hours a week transmission time on ATS-1. In 1984 through further assistance from the United States USP was able to progressively establish ground terminals in the various countries of its region.

ATS-1 however was an ageing weather satellite and transmission on it was quite often not the best possible. In late 1985 it began drifting and as a result became unable to cover the USP region. After a year's lapse in satellite telecommunications USP was successful in negotiations with the International Telecommunications Satellite Organisation [INTELSAT] for the use of one of their communications satellites. Now [1987] with INTELSAT the University has access to 24 hours a day of satellite transmission time.

Satellite telecommunications in University outreach

A fairly diverse range of University activities are being served by this satellite telecommunications facility [see copy of USPNET's current daily schedule on the following page]. A major activity of course is distance teaching where the satellite is

USP NET

UNIVERSITY OF THE SOUTH PACIFIC NETWORK FOR EDUCATION TELECOMMUNICATIONS

24 HOUR MASTER SCHEDULE

TOTAL TIME ALLOCATIONS	PROGRAMME TITLE	GMT	LOCAL TIME			
		GMT	FIJI KIRIBATI TUVALU	NAURU SOLOMONS VANUATU	TONGA NIUE W. SAMOA	COOK IS.
6 hrs	AUTO DATA/ELECTRONIC INFORMATION EXCHANGE (EIE)	1200	12.00am	11.00pm	1.00am	2.00am
2 hrs	OUTREACH EASTERN CIRCUIT	1800	6.00am	5.00am	7.00am	8.00am
1½ hrs	INFORMATION EXCHNAGE	2000	8.00am	7.00am	9.00am	10.00am
1½ hrs	EXTENSION REGIONAL PROGRAMME MANAGEMENT	2130	9.30am	8.30am	10.30am	11.30am
3 hrs	DEVELOPMENT OUTREACH CONTINUING EDUCATION SAT COURSES	2300	11.00am	10.00am	12.00pm	1.00pm
1 hr	EXTENSION STUDIES SATELLITE TUTORIAL	0200	2.00pm	1.00pm	3.00pm	4.00pm
½ hr	INFORMATION EXCHANGE	0300	3.00pm	2.00pm	4.00pm	5.00pm
3 hrs	EXTENSION STUDIES SATELLITE TUTORIAL	0330	3.30pm	2.30pm	4.30pm	5.30pm
1½ hrs	OUTREACH	0630	6.30pm	5.30pm	5.30pm	8.30pm
4 hrs	AUTO DATA (EIE)	0800	8.00pm	7.00pm	7.30pm	10.30pm
24 hrs		1200	12.00pm	4.00pm	1.00am	2.00am

* The Dateline places NIUE, WESTERN SAMOA & COOK ISLANDS one day behind other locations on the Network.

being used both for administration of the programmes and teaching. In the administration of the university's distance teaching program it is particularly effective allowing for regular meetings between Local Centre staff and Extension Services head quarters staff on a variety of day-to-day matters relating to teaching at a distance. As a teaching tool the satellite facilitates audio-teleconferencing enabling students and their tutors to meet and discuss matters of mutual concern regarding their courses and course materials. Apart from audio-conferencing facilities the satellite communications system also enables data transmission.

Beyond these functions the system also serves a range of other more ephemeral groups and organisations such as women's interest groups and librarians in their work in the region.

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.....

Distance Education in Japan

Takashi Sakamoto
Tokyo Institute of Technology

1. Diversity of Distance Education

(1) Distance Education in Formal and Non-Formal Context

Distance education is conducted both in formal and non-formal education. In formal education, primary and secondary schools can undertake distance education either in classroom teaching situation or direct distance teaching situation. For example, school children often study by radio and ETV in their classroom instruction and students of correspondence schools also study educational materials mailed from the school at home.

In non-formal education, both school children and adult study subject materials by broadcast programs or correspondence teaching materials at home or at working places. For example, young children watch ETV programs at home or adults study by correspondence textbooks at working places.

(2) Vehicles for Distance Education

There are three kinds of vehicle for conveying educational materials or information from the educational resource centers to educational institutions: transportation, broadcast and transmission. Educational software such as slide, video cassette tape, floppy disc, audio cassette tape, experiment kits, printed materials and so on are transported to the educational institutions by postal services or traffic means.

Educatinal radio, TV programs, teletext information and so on are conveyed from the center to schools by broadcast, and audio visual information is transmitted by media such as SSTV and VRS. Educational information is also transmitted by telecommunication such as CAPTAIN, Electronic Mail, computer network.

Table 1 shows the configulation of media for distance education. Also Figure 1 shows the flow of media in distance teaching situation. Even if the delivery methods are different, educational software and terminal devices are sometimes the same. Therefore, we can consider a variety of alternatives in distance

education.

(3) Different Types of Distance Education

Different types of distance teaching are widely conducted as shown in Table 2. To begin, there are three major vehicles of distance teaching: transportation, broadcasting and transmission technology; and two major forms of such education: formal and non-formal. In the former case, there are three types: primary and secondary school education, university and college teaching, and university extension courses. In the latter case, there are two types: private coaching school teaching and social education for young children and adults. When the three types of distance teaching vehicles and the five types of teaching are combined, 15 different kinds of distance teaching can be found. The followings are cases in Japan.

The first three relate to regular primary and secondary school education

- Use of AV materials in classrooms.
- Correspondence teaching in 12 independent correspondence high schools and 72 correspondence courses attached to full-time high schools.
- Uses of radio and television in the NHK Gakuen correspondence high school and regular primary secondary school classes.
- Use of CAPTAIN in a primary school and transmission of educational materials via computer network from a local board of education to local schools.

The second three cases relate to regular university teaching:

- Use of video software for teacher training.
- Correspondence courses at 12 private universities and 10 junior colleges, two of which were started in 1974.
- Use of broadcasting in some of the above-mentioned correspondence courses (started in 1958) as well as in the University of the Air (started on an experimental basis in 1971 and on a formal basis in 1983).
- Utilization of transmission technology, i.e., CCTV use at over 20 national universities for teacher education (first begun in 1970 at three universities), audiovisual service by intelibot at the Kanazawa Institute of Technology, distance teaching by the optical fibre lecture transmission system at the Tokyo Institute of Technology, use of facsimile in the University of the Air.

The third three relate to university extension courses:

- A special enrollment system for correspondence courses.
- Use of broadcasting for non-degree students at the University of the Air and at eight national universities started at two universities in 1978).

The fourth three relate to extra-curricular education for primary and secondary school children:

- Correspondence courses conducted by juku schools.
- Teaching by radio and TV sponsored by juku schools.
- Teaching by CAI LAN systems conducted by juku schools.
- Use of facsimile in juku schools.

The last three cases relate to out of school or social education for young children and adults:

- Nationwide social education correspondence courses.
- Broadcasting of educational TV programs for preschool children by NHK and commercial TV stations and broadcasting of social education programs for adults by NHK and those by commercial stations which are sponsored by the central and local government.
- Transmission of social education programs for adults through CATV, HiOVIS, CAPTAIN and VRS.
- Telelearning in Japan Management Association.

2. Recent Trends in Formal Education

(1) Correspondence High School Courses

In 1986 there are 86 correspondence high schools and courses in which 139,325 students (2.6% of high school students in Japan) participate. 12 of these schools including 2 schools described later which use broadcast are independent institutions and 73 are courses attached to full-time schools.

(2) Educational Broadcasting in School

In Japan, educational TV ("ETV") and radio are widely used in schools. In 1985, the rate of schools using ETV and educational radio was, respectively, 96.7% and 9.4% in primary schools, 59.4% and 13.8% in junior high schools and 62.5% and 2.9% in senior high schools. The NHK Gakuen correspondence high school and Bosei High School are the independent distance teaching institution using broadcasts at the high school level. 14 hours of TV and 11 hours of radio programs are broadcast weekly through the NHK educational TV and radio channels. The

number of students, however, has decreased 12,091 from 11,721 in 1964 to 6,783 in 1986 mainly because more pupils go to high schools after finishing junior secondary schools. Bosei High School sponsors daily broadcast through FM radio programs in the early morning and evening for students.

(3) Use of Telecommunication Technology

A videotex called CAPTAIN was experimentally used for teaching chinese characters and the constellations in a primary school, but has been discontinued. In Asahi district, Chiba prefecture, the board of education transmits educational materials to computer terminals at local schools through telephone line, by request.

3. Recent Trends in University Teaching

(1) Correspondence Courses

In Japan there were 465 four year universities (95 national, 36 public, and 334 private) and 548 two-year junior colleges (37 national, 52 public and 459 private) in 1986. 1,879,532 undergraduate students are studying at universities and 396,455 are in junior colleges. They comprised about 34.7% of all 18 year ages.

Formal correspondence courses were started in 1947 at two private universities (although in 1885 a university had sent copies of lectures to extension students); approximately 5.0% of all university and college students are now studying through the regular correspondence courses of 12 private universities (6.0% IF students of the University of the Air included), and 10 private junior colleges. The numbers are, respectively, 96,269 (5.1%) and 17,212 (4.3%).

The number of degree students are 99,000 in universities and 17,000 in colleges. Thier specialities are Humanities (24%), Social Sciences (38%), Home Economics (59%), Education (23%) and others (11%) in four year universities and Humanities (1.3%), Social Sciences (54%), Health (2%), Home Economics (3%), Education (27%) and Art (13%) respectively in 2 year colleges.

These students are somewhat older than the average university student. In university correspondence courses, 20.2% of the 85,571 students we are from 18 to 22 years old, 43.4% were from 23 to 29, 24.8% were from 30 to 39, and 11.7% were over 40

in 1984. Most of them were studying cultural sciences: 38.4% social sciences, 32% education and 24.4% the humanities.

In 1983, 2,161 students got their bachelor's degree through university correspondence courses after more than four years of study; 34.7% after four years, 19.0% after five years, 14.4% after six years, 9.8% after seven years and 22.1% after eight years or more. Also 3,387 graduated from two year colleges: 43.4% after two years of study, 35.3% after three years and 21.3% after four years.

(2) Use of Broadcasting

(i) Use of Radio in Correspondence Courses

Use of radio in correspondence courses began in 1958 at Keio and Tamagawa Universities when they began broadcasting their own programs through commercial stations. However, only Keio University is still broadcasting these radio lectures. Then, NHK began to broadcast university correspondence lectures by radio in 1961 and by TV in 1965. Some universities recognized that students study from broadcast programs and conducted their own guidance and evaluation in connection with these programs. Unfortunately, however such broadcasts are not being undertaken now. It seems that NHK is reluctant to ask professors at these private universities to appear on the air.

In 1976 a project for studying the effective use of radio in correspondence courses was begun, supported by the Ministry of Education, Science and Culture, and since 1978 the same project has been continued with the cooperation of the National Centre for Development of Broadcast Education.

In 1984, five series of 13 45-minute radio programs were produced and broadcast for five correspondence courses, i.e., ethics, sociology, biology, economics and psychology.

In 1986, a series of four 30-minute educational radio programs and their tutoring programs are broadcasted for students in correspondence courses in private universities and colleges every Saturday and Sunday. There are courses in Literature, Law, Mathematics, Economics, Biology, Ethics, Sociology, Geology, Psychology, Philosophy and Geography.

(ii) University of the Air

Since 1969, several governmental committees have presented ideas, basic guidelines and a master plan for the University of

the Air. Parallel to this development, from 1971 to 1977, various sorts of pilot radio and ETV pragrams have been produced and broadcast. The total number is 30 radio series and 56 TV series (not counting re-runs). Several surveys estimating educational needs and studies of the effectiveness of such programs have also been conducted.

In 1978, the National Center for Development of Broadcast Education was established as an institution to be generally available for cooperative studies on the use of broadcasting in university teaching. This Centre has investigated the possibility of management and implementation of the University of the Air and now serves as the core of the University of the Air which was established in 1983.

The Center produced and broadcast 82 pilot series for ETV and 60 pilot series for radio from 1978 to 1984. Each was composed of 15 45-minute programs. Some of these are now or will be broadcast as part of regular courses in the U.A. In the University of the Air, radio and television are widely used in order to provide a wide range of university level educational opportunities. The aims are as follows:

(1) To provide working people and housewives with the chance for lifelong university level education.

(2) To provide an innovative and flexible system of university level education open to high school graduates.

(3) To cooperate with existing universities and make full use of the latest scientific knowledge and new educational technology in order to offer a system of higher education which matches contemporary needs.

In addition, the University hopes to contribute to further improving the educational system in Japan by promoting the transfer of credits and the exchange of teaching staff with other universities, and also by making wider use of the texts and other teaching materials developed by the University.

The University of the Air has three courses: Science in Everyday Life, Industrial and Social Studies, and Humanities and Natural Science, and six majors of which two each, belong respectively to one of each of the above courses, as shown in Table 3. The U.A. had one president, two vice jpresident, 32 professors, 25 associate professors, approximately 150 part-time professors, 184 non academic staff, and 10,345 degree and 6,867 non-degree students in 1986. Students study broadcast lectures, textbooks and reference books, lectures at one of six study centers and submit reports by mail.

The TV and radio programs are produced through the

cooperation of professors or guest professors in the U.A. and program directors of either the U.A. or National Center for Development of Broadcast Education. Radio programs are broadcasted daily from six o'clock in the morning to midnight. In 1986, seven series for basic, nine for fundamental, 14 for foreign language, and 48 for senior courses are broadcasted. One hundred eighteen courses are studied by 102 series of fifteen 45-minute ETV programs once a week and 16 series twice a week. In the University of the Air, all six study centers have audio video cassette tapes for all series of radio and TV broadcast programs and serve them for reviewing. 0.3 to 3.2 per cent of students recorded radio programs or 0.9 to 5.7 per cent recorded TV programs for their home study.

8,976 degree students and 9,674 other kinds of students were permitted to enter the U.A. in 1985. Among them, 8,157 degree students and 8,881 non-degree students enrolled. In terms of degree students, 52.1% are male, 37.7% are in their thirties, and 22% are under 25 years old. 1,264 male students studied "industry and technology", 959 studied "social and economic studies" and 805 studied "understanding nature". On the other hand, 1,213 female student studied "child development and education", 1,186 studied "human cultural studies", and 839 studied "living and welfare". In terms of the students' professions, 12.9% are public officers and 36.4% are businessmen. 1,222 students out of 8,881 non-degree students are without formal qualification as high school graduates and are studying in order to earn credits.

The rates of students who got credits after the first academic term in 1985 are as follows: 66.2 per cent (5,400 out of 8,159) for degree students, 38.6 per cent (2,271 out of 5,891) for part-time study students, 25.8 per cent (456 out of 1,768) for subject study students and 48.6 per cent (594 out jof 1,222) for special study students. But the rates of these to total number of students who enrolled lecture subjects at the beginning of the first academic term are as follows: 38.5 per cent, 26.7 per cent, 20.6 per cent and 26.4 per cent, respectively. In the first year of the University of the Air, 67 per cent of 1,022 respondents to the survey by the National Institute for Multi Media Education watched and listened to broadcasting programs between 9:00 p.m. and 12:00 midnight.

The University of the Air started to use FAX for tutorials to individual students. In the eleven courses such as English, French, Management and Administration, Dwellings and so on, 1,300 students can use this system. Professors are staying in the

study center or headquarters on a special day of the week and respond immediately to questions from students by FAX.

In 1986, 10,345 degree students and 6,867 non-degree students enrolled. In terms of degree students, 50% are male, 31% are in their thirties, and 15.7% are under 25 years old. 23.7% of 17,212 students studied "Child Development and Education", and 15.8% studied "Industry and Technology". After the first term of 1986, 66% of degree students (5,894 out of 8,931) passed the term examination and received credits, but non degree students who passed the examination are 38.8% of part-time students (1,573 out of 4,056), 16.8% of subject-study students (217 out of 1,290) and 53.1% of special study students (575 out of 1,082) who have no formal qualification as high school graduates. But these ratios in regard of the total number of studetns who enrolled for lecture subjects at the begining of the first academic term in 1986 were as follows: 57% (degree studetns), 38% (part-time students), 17% (subject-study students), and 39.1% (special study students).

(3) Technological innovation in remote classroom teaching

CCTV systems have been set up at many Japanese universities. More than 24 systems for teacher training at national universities are unique in that they connect education departments with affiliated primary and secondary schools by coaxial cable. Most of these involve two-way transmission systems. Actual model teaching in schools can be transmitted to the university live and, conversely, instructional materials can be sent to student teachers in schools from the universities.

At Okayama and Kagawa Universities, the distance between the university and its affiliated schools is no less than 7km. Sixteen systems can transmit pictures reciprocally between universities and affiliated schools. The system is generally utilized for pre-training in practice teaching, but there are some difficulties in using it more effectively and more often. Such as lack of technicians, limited funding of facilities, and limited cooperation between universities and schools.

Several experiments have been undertaken on the effective use of remote teaching. Professor Takayama at Akita University taught educational psychology using a televised teaching method, and obtained responses from about 160 students who attended an ordinary lecture class and televised lecture class (one-way transmission). The results showed that students could attend the televised lecture class at ease with little physical fatigue, but

because they attended with the attitude of an onlooker, they gradually became dissatisfied and failed to participate in communicative activities.

Professor Sakamoto and others at the Tokyo Institute of Technology conducted an experimental series of televised lectures on educational psychology in 1974. Also, Professor Suetake used a telephone line to transmit a static visual image to a remote campus at a distance of 30km.

On the basis of these results, the Tokyo Institute of Technology set up a lecture transmission system utilizing optical fibre covering 26.4km between its main campus and remote campus in 1983. This system uses one pair of lecture rooms, one pair of conference rooms, and 29 study guidance rooms. Large-scale distance teaching is undertaken between the pair of lecture rooms and small scale distance teaching is done between pairs of remote study guidance rooms. Students feel the system is convienient.

FAX is also utilized for the campus information optical network system in Tokyo Institute of Technology as will be described later. There is one FAX each in two lecture rooms, two conference rooms and 29 tutorial rooms. We can exchange printed information by FAX.

Figure 2 shows the features of a lecture room and instructor's desk and the construction of a terminal in a tutoring room. The professor can teach by using chalk and blackboard, VTR, slide, OHP and overhead camera. The scence in a lecture room is transmitted to two large video screens in another lecture room. The scence in another lecture room is reversely seen in two monitor TVs in front of the professor. Therefore, the professor and studetns in two lecture rooms can communicate with each other. In a tutoring room, a professor can discuss with and teach a graduate student at a distance. Both can see either each others' face or materials transmitted in a motor TV and also monitor images being sent in a small TV. The cost of hardware is approximately ¥1.1 billion ($7 million), including the cost for restoring the rooms but excluding the cost for building.

4. Recent Trends in University Extension Courses

(1) Special Enrollment Systems in Correspondence Courses

There are special courses for those persons not possessing university entrance qualifications and also for those studying

only specified subjects. They can take classes, but earn no credits.

(2) Use of Radio and TV in University Extension Courses

In 1986, supported by the National Center for Development of Broadcast Education, seven national universities, i.e., Tohoku, Kanazawa, Hiroshima, Osaka, Kumamoto, Hokkaido, Nagoya, Shinshu, Kochi and Ryukyu Universities produced and broadcast a series of 13 45-minute programs for university extension courses, of which 11 used TV and 8 radio. The first three universities joined this project in 1978. In 1983, six universities broadcast eight series of TV, and six series of radio programs. In total 3,620 students participated in the university extension programs, and 1,792 (49.5%) answered questionnaires. 46.2% watched and listened to over 80% of the television and radio programs. 16.4% studied textbooks every week and 28.9% usually studied. 45.5% reported that their expectations were met. In 1985, a total of 6,352 students participated in programs run by ten national universities.

In the University of the Air, the public can freely watch ETV and listen to radio programs without enrolling in the university as well buy the relevant textbooks in book stores. It is assumed that many people study broadcast programs sponsored by the U.A..

(3) HiOVIS

HiOVIS (Highly Interactive Optical Visual Information System) was developed in 1978 and is being implemented by MITI (Japanese Ministry of International Trade and Industry), VISDA (Visual Information System Development Association) and private enterprises. 156 homes and the HiOVIS Centre are connected by optical fiber. The total length of fiber is approximatly 350km.

As each home has one camera, one display panel, and one keyboard, they can communicate reciprocally. The HiOVIS Center can transmit information through 29 channels simultaneously: nine for TV retransmission, one for TV studio broadcasting, seven for video request services, seven for still picture service, and five for other services.

Among this variety of services are social education courses supported by the National Center for Development of Broadcast Education. This series of courses was called the "Citizen's University Course". Three courses were transmitted to monitors:

"Theories and History of Religion", "Education and Society" and "Computer and Society". The first two were taken from the series produced and broadcast as part of the U.A. pilot TV programs. The last one was an original production. 14 monitors answered a questionnaire concerning the program "Education and Society". 64% reported that interest in the topics was high, but 57% reported that these programs did not utilize the merits of two way communication.

Suwa Lake City Cablevision is a large-scale optical fibre network CATV having 26,000 subscribers. In 1985 this system received the three series of ETV program from the University of the Air and rebroadcast them to students' homes. Then some subscribers set FAX or microcomputer connected to the National Institute of Multimedia Education. They sometimes had communication to the Institute for their studies. Now five series of ETV program are utilized for similar experiments.

5. Extra-curricular Education for Primary and Secondary school Children

(1) Correspondence Courses

Many juku schools and education-related industries are conducting correspondence courses aimed at preparing students for entrance examinations to high schools and universities and are also conducting remedial correspondence courses for primary and secondary school children. Juku schools are extra-curricular non-formal schools mainly for preparing entrance examination for good and higher level educational institutions. But some provide remedial courses. Among them, Fukutake Publishing Company's "Shinken Zemi" and Zoshinkai's "Z kai" are well known. Total number of students of "Shinken Zemi" is 900,000 (including 180,000 primary, 430,000 secondary and 290,000 high school students).

(2) Broadcasting

Several Juku schools frequently sponsor radio programmes. Moreover, students can watch NHK's educational television programs at home.

(3) CAI LAN

Some private coaching schools are conducting correspondence teaching using FAX. A rental FAX is placed at each student's home and connected to the one in the private school headquarters via telephone line. Questions and answers, correction of paper and study guidance are undertaken by this system.

The Shochi Juku in Osaka has started to conduct an on-line CAI course. Students can study mathematics and English through the telephone lines. Also Japan Education System Company in Tokyo has started to conduct the "New Media Home Study System". Satelite schools receive floppy discs for CAI software from the headquarters every month, down-load the CAI software to each terminal at each student's home and then gather the study records after students finish the CAI study program. Students study subject matter by VTR and CAI.

Fukutake Company is conducting individual guidance to children by telephone. Counsellors talk to children identified only by number, retrieving information on their achievement scores and rate of response from the computer by using the children's numbers.

In 1985, Fukutake Book Company used dial access audiotape system and ANSER (Automatic Answer Network System for Electronic Request). When students input answers to questions mailed by postal service directly either by pushphone or by voice, they can receive correct answers, scores and KR messages immediately by synthesized voices. Eighty per cent of students injoyed the quick responses.

Recently family computers are widely sold all over Japan. The number of production per year is 7 million units. They are used mostly as game machines, but Fukutake Book Company developed special interface and combined family computer, home TV as display, and cassette tape as device for educational software. Sound comes from audio tape and graphic animation is also available. The cost is rather cheap. New educational softwares for Japanese language, social studies, arithemetic and science are produced every month and utilized by correspondence students of primary fourth and fifth grade level among its 900,000 correspondence study children. This is actually the simplest and cheapest CAI system. The cost of family computer is approximately $80 and that of interface is about $150. The total cost is only $230 if there is a TV set at home.

6. Social Education for Adults

(1) Social Correspondence Courses

In Japan, approximately 450,000 persons are studying various sorts of subjects through social correspondence education. About 170 courses offered by 42 organizations are now recognized by the Ministry of Education, Science and Culture. The standard requirements are that a course must continue over six months, have a textbook and materials, provide correspondence instruction and provide a certificate. 71 courses are related to management and administration, 65 are related to technical skills, and 33 are related to life and culture. On the other hand, many organizations are providing a variety of courses which are not recognized by the Ministry of Education, Science and Culture. Japanese adults would appear to have many opportunities for life long study.

(2) Radio and TV Programs offered by NHK

(i) University Lecture Programs

NHK, established in 1915 as the only nationwide non-commercial public service broadcasting organization, began to broadcast the "Citizen's University on the Air" in 1970, now called "NHK Citizen's University". In 1985, five TV series, each with a semester of three months were being broadcast nationwide. During April, May and June, "Modern Society and Law for Citizens", "New Africa", "Earthquake", "Psychologycal Mechanism of Modern Man" and "Information Science and Human Beings" were broadcast. Also it is reported that about 250,000 textbooks in total for the five series were sold in book stores. In 1986, also five series of fifteen 45-minute TV programs are broadcast from 10:15 to 11:00 p.m. in weekday.

(ii) Adult Education Programs

NHK also is broadcasting many social education TV and radio programs: 17 hours 40 minutes via the NHK general TV channel and 98 hours 50 minutes (including 28 hours 55 minutes school education TV) via the NHK educational TV channel per week, and 93 hours 12 minutes (including 9 hours 20 minutes school education radio) via AM radio per week. Among them are foreign language programs, "Mother's Study Room", "Diary of Secondary School

Pupils", "Today's Health", "Today's Cuisine", etc. In 1983, 1,224 cities, wards (in certain big cities), towns and villages (37% of all Japan) were using these sorts of TV and radio programs for the teaching of social education. After viewing such programs for adults in their own homes people got together to discuss the content with social education leaders. Such meetings were being held at the level of 3,441 classes in 1,224 cities and other areas in 1983. The most frequently viewed TV program was "Mother's Study Room" which is broadcast everyday from Monday to Friday for 25 minutes in the afternoon on ETV channel and rebroadcast in the morning on GTV channel. 206,234 mothers viewed and discussed the content of this program at 2,173 meeting places nationwide as a part of the social education program supported by local boards of education and NHK. In 1984, 191,442 mothers together to discuss this project. This series in 2,833 social education projects is nearly half of the total number of social education projects and participants.

(iii) ETV for 2 year old children

Educational television programs for 2 year old children are also broadcast through the NHK general TV channel. They are produced by cooperation among TV directors, child psychologists and educational technologists. Young children are willing to watch them every morning.

(3) Social Education via CAPTAIN and CATV and VRS

CAPTAIN and VRS can be used for social education. Information providers now offer several kinds of educational materials through CAPTAIN. Learning programs for Japanese, English, Arithmetic and Science are examples. Learning programs for English, microcomputers, science, social studies and calligraphy, are transmitted through VRS in the model system in the Mitaka area in Tokyo. The Osaka Society of Engineering Industries started to transmit audio and graphic distance teaching on an experimental basis to four industrial companies for two hours a week by using a special telecommunications channel. This is a kind of industrial education by CAI. In some of the 550 recognized CATV systems (which have over 501 contracts), social education TV programs are being transmitted to viewers in a number of neighbourhoods. Among them, CATV Aichi, Tosha Yusen TV, Watsukacho CATV and Kake City are examples. Two or three are specialized systems for education.

ACCS in Tsukuba is rebroadcasting TV programs from 12 TV channels, broadcasting self-made programs via channel 9, and conducting cable text service, poling service, user response system, and security system. The channel 29 self-made science programs. CATV would be useful especially for regional distance education from study centers.

Recently JMA (Japan Management Association) started to conduct Tele-Learning College for in-service industrial education. The system can reciprocally transmit voices and visual images via two telephone lines. The main hardware is composed of microphones, loudspeakers, electronic three colors on electric boards are simultaneously transmitted from the telecasting center to study centers in different industries via NTT Tele-Conference Network as shown in Figure 3.

JMA transmits four courses from 6:00 p.m. to 7:30 p.m., respectively, on different days of the week for 12 weeks. The subjects are "Innovation practices fro managers", "Fundamentals of AI", "New techniques on biotechnology" and "Fundamentals of electronics". An average of ten to 15 learners in one study center or more than 200 people in 12 different industries are studying by this system. The cost of the system is approximately $100,000 for purchasing terminal equipment and devices (half price for monochrome video devices) and telephone fee is added. Tuition fee and cost for textbooks are also needed. The average assumed cost for one person and one course is about $230 in the Tokyo area, and much more in other places. This set of tele-training system is useful for distance education but there are some problems. When many learners want to ask questions simultaneously, it is rather difficult for one person to be selected as a representative. As the lecturer is not seen on TV, he should continuously describe his behavior such as "picking up dropped piece of chalk", "intending to delete characters and figures on the electric board", "lookin for lost materials" and so on. The audience may usually feel restless if they have idle time without visual movement and auditory stimulus.

VRS (Video Response system) is also a medium for transmitting still and moving pictures with sound from the information center to users via broad band cable. There are three kinds of services: (i) still picture such as color photographic picture, character, graph and figures; (ii) motion picture and moving image; (iii) sound, human voices (message) and music. When users ask to watch still picture with sound, the access time is only 0.1-0.5 seconds. But the access jtime to view moving picture is seconds. When many users ask for it

simultaneously, some cannot get the information asked for. Although VRS is now experimentally utilized, it would be useful for distance education in cases of audio visual education and a sort of CAI. At the moment the number of educational software in system is very few. Among them, we can study introduction to English, English abroad, mathematics, science, social studies, Japanese calligraphy, introduction to microcomputer, network planning, etc. VRS includes both the characteristics of CAPTAIN, the remote access video control system and more.

6. Concluding Remarks

- Introduction of new communication technology -

In Japan there are various kinds of distance teaching. In many cases modern communication technology is utilized for increasing the effectiveness of distance teaching. Recently, the concepts of lifelong education, higher education and permanent education have taken root. Distance teaching is regarded as one of the best ways to provide opportunities for study to adults unable to attend universities or higher educational institutions due to geographical, physical or vocational reasons.

The University of the Air and university correspondence courses are useful for those who want to get a bachelor's degree. Various sorts of communication technology seem to be helpful for reciprocal transmission of lectures between campuses within a university or between different universities.

Distance teaching by broadcast for school children is also effective in classroom teaching as well as in home studies.

Communication technology is also useful in university extension courses. In the case of social education, broadcasting has a great deal of influence as a tool for providing a variety of information.

Recently, new technology such as CAPTAIN, VRS and computer networks have begun to be utilized.

In 1985 utilization of new electronic media will be much more significant than ever, and it will become clearer which media are most suitable for use in education.

The year 1983 can be said to have launched several new media. It was World Communication Year, and various notable events in the field of new electronic media took place all over the world. In Japan, a major international conference on new media was held. And in October an experiment for practical application of teletext was started, which meant the opening of a

new world for persons who are hard of hearing. It marked the debut of one of the so-called "broadcast new media".

The next year, in 1984, other new media entered on to the stage. In January, a broadcasting satellite was launched for practical use in Japan. In September, experiments on a highly sophisticated information network system (INS) were started with the installation of a model system in the Mitaka area in Tokyo, thus marking the formal introduction of a wire telecommunication new media. Furthermore, in November, commercial service of the CAPTAIN (Character and Pattern Telephone Access Information Network) System, a Japanese version of videotex, was inaugurated.

At the same time, the dissemination of some new media which do not belong to either the broadcast or wire telecommunication group began to spread steadily. The leader of this group is personal computers, annual production of which exceeded 1.9 million units in 1984. Videodiscs and compact discs followed in their wake.

The year 1985 is called as "First Year of Educational Computing". In this year the introduction of microcomputers into schools were promoted by central and local governments, teachers and industries.

Of course, not all of these new media are available for educational purposes. However, they all have the potential for application to distance education if they are utilized properly.

At present, the practical contribution of these new media is not very great. At best, experiments using them for educational purposes attract little public attention. Yet they should not be ignored. If certain conditions are met, it is always possible that some of the new media will develop and eventually have as great an influence on education as the broadcast media does today.

These methods of distance teaching should have a great impact on not only distance education, but also conventional school, university, and social education in terms of instructional methods.

Table 4 shows how a large quantity of well-prepared educational information at a remote place can be utilized through new media.

The top row describes the case where individuals or small groups of students do lessons with the help of information transmitted from a remote source. Each learner can study his lessons according to his ability and interests at his own pace, using such systems as two-way CATV, CAPTAIN, VRS, LAN and CAI.

The second row of Table 4 shows the case where a teacher retrieves teaching materials transmited from a remote place at the terminal in a classroom and uses them in teaching the students. In this case the teacher uses a system for retrieving information sent from a teaching material data base via two-way CATV, CAPTAIN, VRS, teletext, still picture broadcasting or LAN. The terminal in the classroom is connected with a 2 optical fiber communication network. In some cases information retrieved from the data base is pooled at the school, and then relayed to classrooms with an in-school broadcasting system or LAN.

The third row of Table 3 shows how teachers can use a bibliographical data base and teaching material data base in remote places for desk work.

If it becomes possible to retrieve data-base teaching materials freely at each school, classroom lessons could become much more substantial. Local education centers could also prepare teaching material data bases and offer services to local schools, although they may not be on a very large scale.

As mentioned above, there are great opportunities for utilization of new media in education. In reality, however, more time and accumulation of research and development efforts will be required before the use of the new media spreads widely among Japanese schools.

Table 1. Kinds of Media for Distance Education

Method of Communication		Delivery		Terminal Device	System
		Software	Hardware		
Transportation Postal Service Transportation Service		*Printed material *AV material *Educational Software	*Vehicles	*Projector *Player *Microcomputer *Wordprocessor	Correspondence stand alone unit
Broadcasting		Auditory information Character Still picture Graphics Moving picture	AM FM VHF UHF	Radio receiver TV monitor	Radio TV Broadcast Teletext
Transmission	Video transmission	AV information	*Telephone line *Coaxial cable *Optical fibre *Broadcast	VDT	SSTV VRS
	Tele communication	Character Graphics Still picture	Telephone Optical fibre	Telewriter Microcomputer Electric Boad	Videotex FAX Electric Mail Telemail LAN

Table 2. Various Types of Distance Teaching

Form	Vehicle Type	Transportation	Broadcast	Telecommunication
Formal	Primary & Secondary Education	- Use of AV materials in classroom and CAI - Correspondence schools and courses	Use of educational radio and television in classrooms - School of the Air	Videotex use in schools Data transmission - CATV
	University & College Education	- Use of video software - Correspondence courses in universities and colleges	- Use of radio in correspondence courses - Open University	CCTV Optical fibre lecture transmission Electric Mail, Facsimile
	University Extension Courses	- Special enrollement in correspondence courses	- Use of radio and TV in university extension - Open University	- CATV
Non-Formal	Extra-Curricular Primary & Secondary Education	- Correspondence teaching in private coaching schools	- Use of radio by private coaching schools	- Videotex in private coaching schools - Telephone and microcomputers Guidance system - Use of Facsimile, Electric Mail
	Social Education	- Social correspondence education courses	- Use of social education broadcast programs - ETV programs for young children	- Use of Videotex - Use of VRS - CATV - Teletraining - Teletext

Table 3. Outline of Disciplines and Majors in U.A.

Science in Everyday Life	Living and Welfare
	Child Development and Education
Industrial and Social Studies	Social and Economic Studies
	Industry and Technology
Humanities and National Science	Human Cultural Studies
	"Understanding Nature"

Table 4. New Media to be utilized in Distance Education

Purpose	User	Subject	Function	Media System	Component
Teaching	Learner	Learner	Self teaching	Interactive CATV VRS CAPTAIN LAN (CAI)	Communication devices Terminals
	Teacher	Learner	Educational Material Presentation	Interactive CATV VRS CAPTAIN Teaching Material Data Base Teletext Still Picture Broadcasting	Communication devices Terminals
Management and Administration of Teaching	Teacher	Teacher	Information Retrieval	Educational Material Data Base Reference Data Base	Communication devices Terminals

Figure 1. Structure of Media

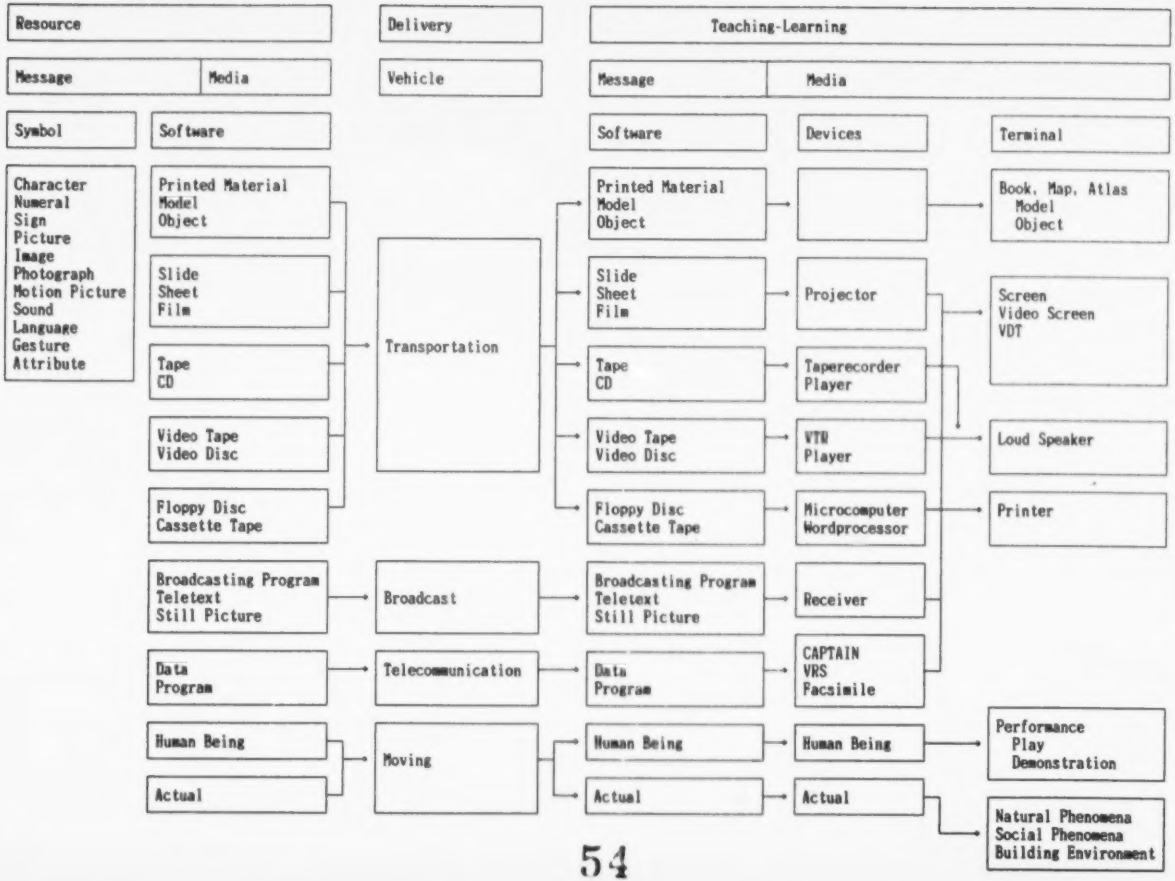
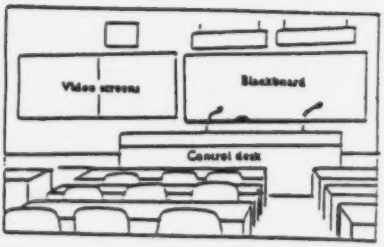
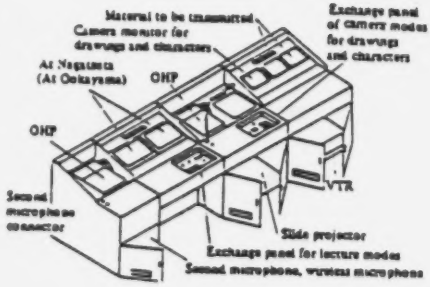


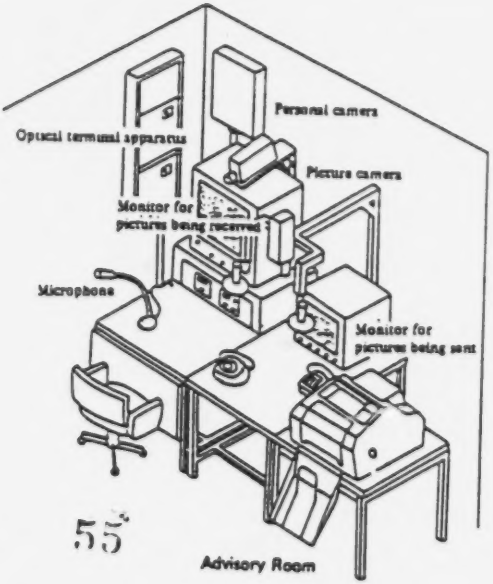
Figure 2.



Lecture room



Instructor's desk



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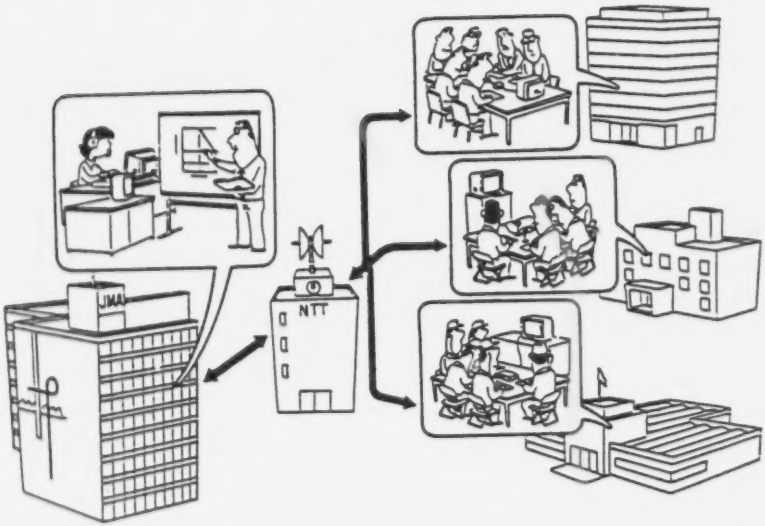
Advisory Room

Figure 3.



THE UNIVERSITY FOR DISTANCE EDUCATION IN COLOMBIA : AN ALTERNATIVE FORM OF EDUCATION

Linda Gladys Behaine de Cendales

Bogotá, Colombia 1987

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3. Demand for education and its limitations
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INTRODUCTION

This paper deals with one of the Colombian Government's key programmes in the field of education, namely The System of Distance Education.

This non-formal method of tuition aims to make Tertiary Education accessible to all Colombians with a view to providing solution to the problems arising from population growth and the current shortage of centres for Tertiary Education. It is hoped that it will go some way towards meeting the needs of the nation and the demands for more services.

For the programme to become a reality, the premise has been adopted right from the start that there is no one solution and that there are no pre-established models, nor rules that cannot be modified. This premise has given rise to what has become known as the Colombian Model: an organi ational and academic structure embodying a creative process that has emerged in the various Institutes in their search for the most suitable strategy for their particular requirements.

The Colombian Model is here to stay. It must be understood as a dynamic, flexible and open system under continual evaluation and revision.

The programme described in this paper is the joint effort of the Government and private sector. It is the answer to many Colombians eager for education.

THE UNIVERSITY FOR DISTANCE EDUCATION IN COLOMBIA
AN ALTERNATIVE FORM OF EDUCATION

Linda Gladys Behaine de Cendales

1. General framework

Colombia is situated in the North-Western part of South America and covers an area of 1 141 748 km^2. It has an extensive coastline with ports both on the Atlantic and Pacific Oceans. The country consists of 1 019 municipalities which make up 33 politico-administrative departments. All these departments are ruled on the basis of democratically elected representatives. In addition, there is a Special District, Bogotá, which is also the country's capital boasting a population of close on 6 million.

Colombia has 29 million inhabitants, most of whom live in the Mid-Western Andine region. Demographic statistics predict that within 20 years this figure will increase to 38 million, making the country one of the most highly populated in Latin America after Brazil and Mexico.

Since the 1950s, socio-political factors have led to 63% of the population being concentrated in the capital, Bogotá, and regions of economic growth. However, Colombia has a large number of intermediate cities which, by the end of the century, will account for 75% of the total population – with serious repercussions on the demand for goods and services.

2. The educational system

Every level of education is regulated by the Country's constitution and by a series of laws, decrees and resolutions.

Primary education covers 5 years. It is compulsory for all Colombians without exception and it is provided absolutely free. Most centres of education right from pre-school to higher or University level are private.

In recent years, the 1976 reform of the Educational System and the 1980 reform of Tertiary Education have provided a clear definition of the terms Formal and Non-Formal (Distance) Education, determining their respective levels. In addition, these reforms have made provision for the integration of Special Education (for the physically or psychologically handicapped).

The various levels of the Formal System (where attendance is required) are:

Pre-school
Basic education (primary and secondary)
Vocational training
Higher (tertiary) education

Tertiary education comprises the following:

Intermediate Professional Training
Technical Colleges
Undergraduate and Postgraduate University studies

For its part, the Educational Sector is made up of a series of Institutes - operating at central and regional level - whose purpose is to guide, direct and implement educational policy.

2.1 Tertiary education

The increase recorded in secondary education and vocational training provides guidelines for determining the demand for studies at the tertiary level. Over the last 10 years, University registration has gone up by 272%.

Growth in tertiary education in general is characterized by: 1) increased participation by the private sector which now exceeds 60%; and

2) a greater intake of female students in Universities.

In addition, an upswing in registration for night school has been recorded and here Government sector participation stands at 78%.

The last decade has revealed the following trends:

Growth in the areas of:	Administration and Economics, Engineering and allied fields, Health
Reduction in:	Exact and Natural Sciences Humanities and Social Sciences.

The number of educational establishments has increased as has the number of curricula offered which include night courses.

2.2 Special Education

The increase in the number of these establishments is due to the official sector. They cater for students with learning problems, behavioural problems and language problems as well as for students who are mentally retarded, deaf, blind, half-blind or afflicted with neuro-muscular disorders.

2.3 Education for adults

This covers a series of programmes ranging from basic primary and basic secondary levels to levels where technical training is given within a non-academic framework. It also includes training and rehabilitation of prisoners and others.

3. Demand for education and its limitations

The trend of the Colombian educational system is to satisfy the demand for education at every level. At primary level 98% of the demand has been met and at secondary level the figure is 37% (2 200 000). At tertiary level only 8.3% (400 000) of the demand has been satisfied and with the increase in Intermediate Education this percentage will become even smaller.

Demographic studies confirm that from now until the end of the century 11 million people will join the economically active population and that most of these will have had no tertiary education unless a more extensive system is developed. In view of the above, it has been deemed necessary to introduce mechanisms which will

1) utilize resources effectively
2) increase technical capacity
3) create jobs
4) expand production, etc.

These and other problems cannot be adequately addressed by Formal Education (where attendance is required) if the following are borne in mind:-

- The high cost of new centres
- The distribution of the Colombian population. In many cities the low population density and limited economic resources restrict the proper functioning of a university.
- The economic conditions of the population, which may prevent matriculants from attending university, forcing them to take up employment that does not require qualifications and skills.

4. The need for a Distance University

The aforementioned considerations point out the limitations of formal education (where attendance is required), and lead to a plan for the development of a System of Open and Distance Education (SED), comprising strategies and a methodological focus with definite objectives.

4.1 Objectives of Open and Distance Tertiary Education (EAD):

- To create new professional opportunities, in order to attain a fairer society.
- To strive towards equal opportunities regarding acceptance into Tertiary Education programmes.
- To serve sectors of the population which do not have the opportunity to attend programmes offered by the Tertiary Education Centres, due to reasons of employment or geography.
- To prepare and train professionals in areas which are necessary for development, both nationwide and regionally.
- To establish permanent Programmes of Education, training, additional training, and actualization for professional persons.
- To design lasting evaluation mechanisms in order to assure the quality and seriousness of the programmes.
- To foster creativity and scientific research.

5. History of Distance Education in Colombia

The System of Open and Distance Tertiary Education in Colombia relies on almost 40 years of experience in Distance Education, by means of the mass communication media and the use of multi-media (various media combinations).

In 1947 the Popular Cultural Action (ACPO) initiated this work by means of teaching via the Radio – the "Radio School". This tuition was soon complemented by ABCs, lessons by correspondence and printed matter distributed by the "El Campesino" newspaper.

Literacy was the initial programme, but soon this was widened to include fields which were related to life in the countryside, viz. health, housing, horticulture, etc.

In 1953 the NATIONAL LEARNING SERVICE (SENA) was created. Its programmes related to education and labour, and provided technical training.

In 1968, the field of experience was expanded through the use of television in the Tele-centres. They enabled the introduction of Matriculation (courses) by radio. Already in 1972, some universities tried out an expansion of their systems and programmes of Tertiary Education on the grounds of previous findings:

- University of Antioquía : Teacher Training
- University del Valle : Nursing
- University La Javeriana and
  University La Sabana : Teacher Training

These innovations led the government to begin pondering about this modality of extending Tertiary Education, in view of the limitations presented by a system of formal education (where attendance is required).

5.1 Basic Criteria of the Distance University System

The system is characterized by the following criteria, which were reached by means of engaged study:

- The system, aided by multi-media, should take education to the people, wherever they might live and work.

- The education programmes should answer to the training needs of working persons and to the productive possibilities of the students' specific region.

- The system should widen educational opportunities in existence in the country's educational institutions.

6. Legal Framework

In Colombia, the system has been incorporated into current legislation, by force of regulations proclaimed in decrees dated 1980, 1982 and 1983.

7. Characteristics

The Colombian Model presents specific characteristics:

a) It does not create a specific university to develop the programme; on the contrary, it makes use of existing institutions, enabling them to incorporate themselves into the system. This reduces costs, as human, material and physical resources are in some cases under-utilized.

b) Each institution draws up the programmes it wishes to offer, and is responsible for their administration and quality control.

c) It is envisaged that there will be co-operation between entities in the public and private sectors, at national, as well as at district and municipal levels.

d) Studies effected through the distance method, and degrees obtained in this way, will have the same value as those conferred by institutions offering formal programmes (requiring attendance).

e) The SED (System of Open and Distance Education) offers training from Matric onwards, in the fields of professional or technical training, and university (including post-graduate studies).

f) The programmes begin at an introductory level, which teaches the method and grades basic disciplines.

g) University institutions may organize regional centres of EAD (Open and Distance Tertiary Education): CREAD (Regional Centre for Open and Distance Education), whose aim is to offer a service to the programme users. They may also create CIPAS (Circles of Academic and Social Participation) for the purpose of interaction and human enrichment,

h) The ICFES (Colombian Institute for the Promotion of Tertiary Education) is the official entity responsible for the planning, promotion, co-ordination, approval and advising of the entities, as well as the empirical evaluation of the programmes.

i) Programmes which require attendance may be converted into distance programmes and vice-versa.

j) The students may be transferred from formal programmes (requiring attendance) to distance ones, and vice-versa.

k) The Radio and Television Institute has available space for Tertiary and Distance Education programmes.

8. Models for Distance Education

It has been rightly said that the EAD model in Colombia constitutes an own model, because it relies on a network of existing institutions (private as well as public). In all cases, each institution maintains its autonomy.

From the organizational point of view, it grounds itself on a twofold basis:

a) Centres which supply education (Tertiary Education institutions).

b) Demand Centres, or "Regional Educational Resources Centres" (CREAD). Their number and location depends on criteria such as:

   a) Population density.

   b) Support and contributions by the regional community, which commits itself to co-operation.

   c) Socio-economic diagnosis and evaluation of the number of participants.

   d) Resources which ensure the duration of the project for a minimum of 5 years.

   e) Strategic geographical location, in relation to regional development.

   f) Priority attention given to zones which have the least opportunities for formal education (requiring attendance).

   g) Physical and technological infrastructure, which will ensure the quality of the programmes.

   h) Offers of at least one formal and one distance programme.

9. Organizational models

The model chosen for the development of distance programmes is generating a number of organizational structures. There follows some of these (structures):

9.1 General Organizational Structure (Graph No. 1)

This comprises the already universally known models such as the Centralized, the Autonomous and the Decentralized, and it introduces each university's innovations.

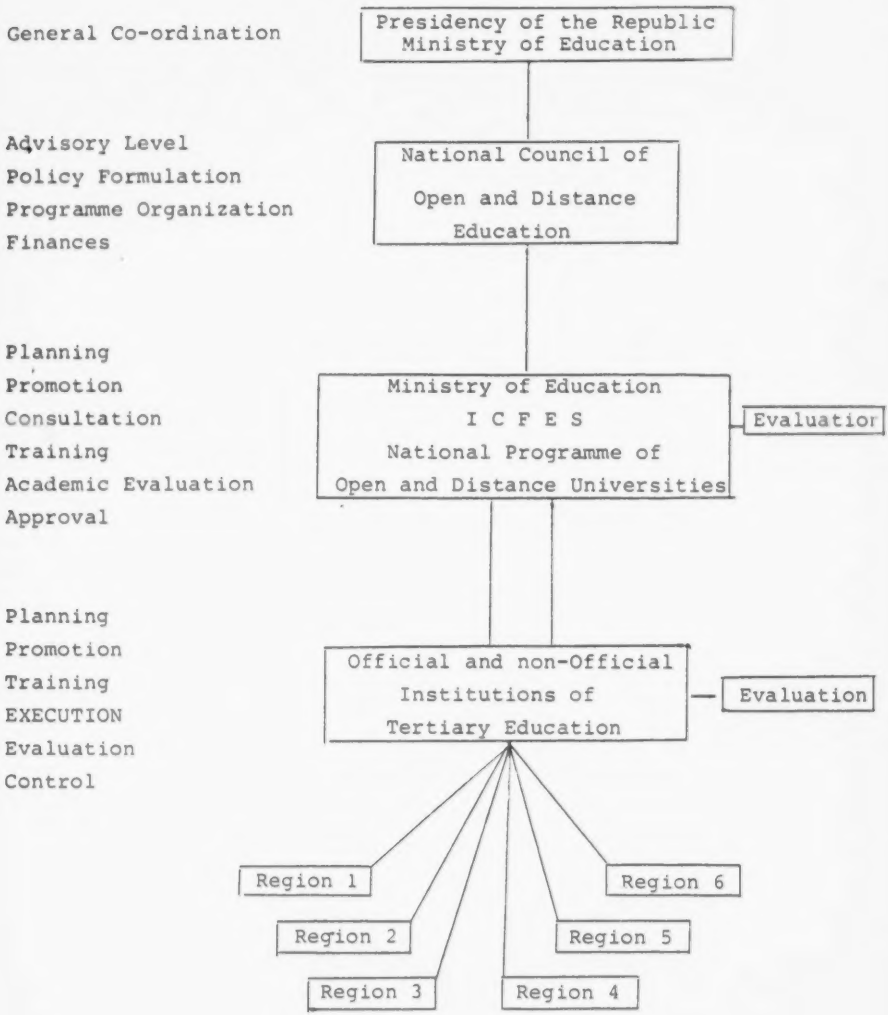
This graph establishes the existence of three levels:

- In the 1st, the political (level) relates to the Presidency of the Republic, the Ministry of National Education and the National Council of Open and Distance Education.

- The 2nd level is strategic and contains the ICFES (Colombian Institute for the Promotion of Tertiary Education).

- Finally, the operational level comprises the Tertiary Education institutions.

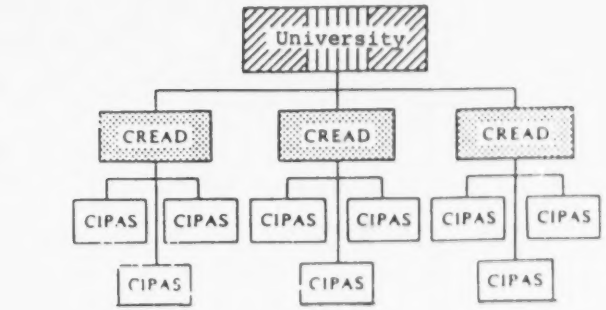
Graph 1. General structure of the System of Open and Distance Tertiary Education - SED -



9.2 The Integral Model (Graph No. 2)

This model entails an institution of Tertiary Education, which serves as headquarters. This institution organizes its own CREAD and from this the respective CIPAS will arise.

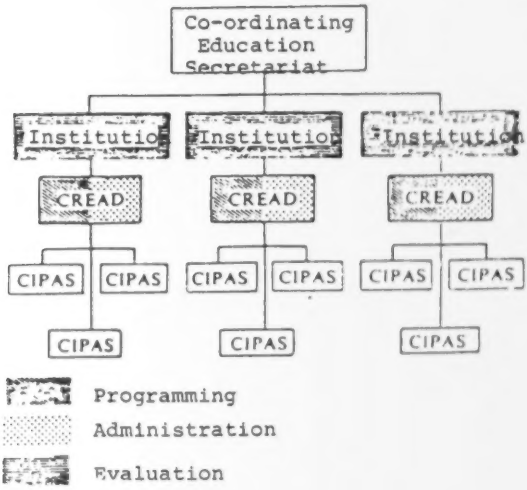
GRAPH 2. The Integral Model



9.3 Multiple Integral Model (Graph No. 3)

An official institution, e.g. a department's Secretariat of Education (Territorial Section), will be responsible for the regional co-ordination of the institutions which wish to offer Distance Education, with the aim of programme planning; each institution, in turn, independently carries out its own programmes.

GRAPH 3. Multiple Integral Model



9.4 University of the South, Bogotá - UNISUR -

Aside from the abovementioned options of organizations and structures, it was conceived that one institution should take the lead within the system. For this purpose, the UNIVERSIDAD DEL SUR (University of the South) was founded in 1981, with government funds. Its aim was also to make Tertiary Education more democratic. In order to promote social change, the following programmes were set up: Engineering, Management, Social Advancement and Development, Energy Resources.

10. Means of Support

a) It is foreseen that the basic tuition material is in written form. In addition, there are materials for Radio and TV, press, teaching through computers, slides, book-cassettes, video-cassettes and others, depending on means and capacilities.

b) Tutorials form the basis of the systems. These can be done personally, by telephone, by correspondence, or by other means.

c) Library Services of each institution, for the purpose of consultation.

d) Academic and Social Participation Centres (CIPAS).

In Bogotá, the Documentation Centre of the ICFES.

CIPAS CIPAS are constituted by students who are enrolled in the distance courses or programmes, They meet in order to assist each other by analysing the lessons, preparing for exams, and deepening their knowledge.

These centres also facilitate social interaction.

The DOCUMENTATION CENTRE on Open and Distance Education offers its users: reports, meeting proceedings, journal articles, monographies and audio-visuals on Distance Education, as well as Modules and Texts created by programmes in Colombia and in foreign countries.

Services:

- Telephone consultations at tel. no. 2 45 09 78
- Personal consultations in the lecture hall
- Loans of programmes, and inter-library
- Copy of audio-visual materials
- Photocopies. Address: Avenida 40 # 16-32 Bogotá, D.E.

11. Admission

- All persons in possession of a Senior Certificate (Diploma) will be admitted into the programmes.
- The registration fees and other relevant procedures for admission will be determined by the post-secondary (Tertiary) Institutions.
- Every registered (and accepted) student has to pass the Introductory Level.
- Prior to their admission, Foreign students will have to have their qualifications (equivalent to Senior Certificate) recognized by the National Government.

12. Perspectives on Distance Education in Colombia

A plan has been devised, for the participation of International Entities, which may offer technical, logistic and financial support.

Among others, there will be participation of: UNESCO, OEA (Organization of American States) and BID (Inter-American Development Bank).

One of these projects will cost a total of US $ 65 000 000. Of this amount, US $ 37 000 000 originate in foreign credit, and US $ 28 000 000 come from national funds.

The aims of this project are:

- Student care, programmes in priority areas, organization of CREAD, training of persons, outline of modules, setting up of laboratories and workshops, libraries, information, research, etc.

13. Attached

Please find attached detailed information on the Institutions, programmes and modes of Tertiary Distance Education which are in existence in Colombia in 1987. There are 59 173 registered students who are working. These are attached to 241 CREAD and have been attended by 2 265 tutors.
Published modules: 951 (till 1985)

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DEVELOPMENT OF DISTANCE EDUCATION IN SRI LANKA

by

Professor Dayantha Wijeyesekera
Vice-Chancellor, The Open University of Sri Lanka

1.0 INTRODUCTION

Distance education has grown substantially in many countries of the world. The opportunities throughout the world for learning at a distance have expanded rapidly in the last two decades. The evolution of distance education in print form spans a century, in audio form over half a century, in video form over a quarter century, in multi-media for about 15 to 20 years and in its most recent form, satellite based for 5 to 10 years.

The traditional and prestigious educational institutions are accepting distance education as legitimate and feasible. The academic staff from such institutions are not only collaborating with institutions of distance education but also there is a flow of academic staff from such institutions to distance education institutions.

There is widespread use of distance education especially in developing countries to accelerate the provision of equal opportunities in education for their people.

2.0 RELEVANCE OF DISTANCE EDUCATION FOR DEVELOPING COUNTRIES

Developing countries the world over usually face common problems such as shortage of schools, provision for the training of teachers, trained teachers and administrators together with lack of appropriate text books, instructional material and laboratory facilities.

The advantages of distance education should be of particular interest to developing countries not only because of the cost effectiveness but also because of social and communicative interaction which depend a great deal on an individual's learning. In this context distance education would be significant in developing countries not only in breaching barriers of geography and time, but also of those psychological.

In most developing countries the demand for higher education has consistently run ahead of the resources available. In the past, higher education was the monopoly of the elite and prosperous but with the passage of time modern social objectives have developed urging the democratization of education by extending educational opportunities to all sections of society.

It would not be possible to fully achieve this objective purely by institutionalized formal education not only due to the heavy cost which developing countries can ill afford, but also because it cannot satisfy the aspirations of millions of employed men and women who want to further their education and yet remain in employment as such they cannot afford to be full-time students.

3.0 FORMS OF DISTANCE EDUCATION

In general the form of distance education to be adopted in a particular society will depend upon :

- government perception of need;
- the realization by individual institutions that there would be growing interest in the adult market for such a programme of study;
- demand for courses and programmes of study by people living in remote areas.

In the above context,distance education institutions have been established in various forms, ranging from correspondence schools, universities in the air, home based universities, dual mode universities, extension departments to traditional universities etc.

4.0 SRI LANKA INSTITUTE OF DISTANCE EDUCATION

The need for distance education in Sri Lanka was initially met with the setting up of the Sri Lanka Institute of Distance Education (SLIDE) in June 1976. During this time nearly 500,000 students sat the G.C.E. (O.L.) or its equivalent examination, out of which nearly 50,000 students sat the G.C.E. (A.L.) for about 5,000 places in the university system. Furthermore, many who were employed were desirous of furthering their education by obtaining theoretical instructions relevant to their occupation while continuing to be in employment. The courses of study at this institution (SLIDE) were at Certificate and Diploma level in the fields of Management, Mathematics,Science and Technology.

Even though, technical and science subjects were being taught through distance education with tremendous success in advanced countries such as the United States,through their Technical Universities and Institutes and also through the Polytechnics in Russia, it was a remarkable breakthrough for a developing country like Sri Lanka to initiate technical education through distance education along with the other courses in the Humanities area.

The SLIDE experiences revealed at that stage, that with the available resources distance education techniques were more suited for middle level technical education and for the education of graduate school teachers in

employment and of course for other short-term courses.

5.0 THE OPEN UNIVERSITY OF SRI LANKA

The establishment of the Open University of Sri Lanka in 1980 by Act of Parliament enhanced the scope of distance education in Sri Lanka. Further, UNESCO assistance was available to develop the programmes of study through expertise, staff development and assistance towards equipment. Senior academics from traditional Universities were attracted to join the new University with a different concept. New programmes of study were commenced and at present the following programmes are being conducted and the present student number totalling 13,750 is enrolled into the different programmes of study as shown below :

Programmes of Study	No.of Students
Post-Graduate Diploma in Education	2957
LL.B Degree Programme	909
Certificate in Pre-school Education	376
Certificate in Professional English	4000
Certificate in Entrepreneurship	183
B.Sc. Degree Programme	780
Foundation	2044
Technology	2052

Some of these programmes have completed more than one cycle of operation whereas the others, especially the longer courses have still to complete the first cycle of operation.

6.0 RELEVANCE OF BASIC CONCEPTS ADOPTED

6.1 Types of Programmes of Study

It has been found that the shorter the duration of a programme of study, the greater the attraction and lesser the dropout rate. Therefore, the programmes of study here are at Certificate level, Diploma level and also at Degree level. Commencement of courses at degree level where laboratory work is involved has been planned out very cautiously. Careful studies are being carried out on the feasibility of conducting an Engineering Degree Programme of Study. However, courses at Post Graduate Diploma level with a view to specializing or for converting those already possessing first degrees in the relevant fields fit into the primary objective of upgrading those in employment and such courses are also being seriously considered.

6.2 Educational Technology

In adopting the multi media approach to impart instruction, due consideration is being given to Educational Technology to be utilized within the resources available.

(i) Printed Material

The main component of the course material is the specially designed printed material, Course Teams consisting of academic staff from the Open University as well as from other Universities and also from industries have coordinated, producing this material. Steps are also being taken to include a member of the Educational Technology Group into this course

team not only to contribute to the style of the printed material but also to decide the need for supplementing the printed material with Audio-visual material and also to decide at what point of time it should be done along with the printed text.

(ii) Audio-visual facilities

Audio and video cassettes are becoming very popular not only at distance teaching institutes, but also in traditional institutes. The academics usually feel that they have more control over their use and can integrate cassettes more tightly into course design. Furthermore, resource material bringing in recordings of real life situations, conversations, interviews, practical applications, case studies etc. could prove more effective than a formal lecture in a classroom or studying directly from a text book.

With cassettes provided to the students as part of the course material they too find it convenient to study whenever they wish to study. They have control over the cassettes and the ability to repeat are among the advantages. Audio visual material developed would primarily be related to the course material; however, the Open University of Sri Lanka as a source of public education would resort to regular radio programmes and perhaps television programmes too in the near future. For various reasons such as very high quality required for broadcasting

and non-availability of radio and TV receivers among the poorer students, broadcasting of lesson materials to students is avoided at present. However, narrow-casting of video material at Regional and Study Centres is being provided for the specific use of the OUSL students in addition to the audio cassettes distributed to the students along with the lesson material.

6.3 Face-to-Face Student Contact

Careful consideration is being given to the quantum of face-to-face student contact sessions necessary for different programmes of study. This quantum varies from course to course in order to ensure sufficient dialogue but, at the same time concern is expressed with respect to excessive contact requirement which may be a disincentive for the employed students. The face-to-face sessions comprise seminars, day-schools, practical and demonstration classes, field work, drawing office work, workshop practice etc.

An important low cost concept adopted at the OUSL is to conduct practical classes at the Regional Centres for the first year students and at the Headquarters for the latter years. This eliminates high costs involved in purchasing and despatching home based laboratory kits as adopted in some of the Open Universities in the developed countries. The students have to attend the Regional Centres and the Headquarters for a block period at a time varying from a minimum of one week to a maximum of four weeks at a time in any particular course during their study period.

6.4 Regional Educational Services

The Regional Educational Services play one of the most important roles in distance education. The 13 Regional/Study Centres are located in such a way with several criteria in mind (See appendix 1).

i. the four Regional Centres are situated in the proximity of traditional universities, so that assistance in practical classes and other face-to-face sessions could be sought from the traditional universities;

ii. the Study Centres are located with a focus on the local student population so as to ensure that a student usually need not travel more than 50 miles from his/her residence to the centre;

iii. the Regional/Study Offices as far as possible are established in the vicinity or in the compound of existing Technical Colleges or Schools so that physical facilities and other services could be shared.

It has been found essential for better efficiency that the Regional/Study Centres be managed by full time officers of the University. This has been achieved by the OUSL to a great extent. However, a few of the centres are still being manned by the Principals of the Technical Colleges.

7.0 CONCLUSIONS

i. Distance Education has undoubtedly proved to be a great asset to developing countries like Sri Lanka, where large masses both for professional development and personal development are seeking to further their education

ii. Technical education upto middle level, i.e. technician level has proved to be very feasible though costing about three to four times more than the other general courses.

iii. Education at the Degree level has to be carefully planned, especially in fields where the students' contact component for practicals and laboratory work play an important role.

iv. Conversion courses or specialization at Post-Graduate Diploma level for those who have already obtained the first degree in an allied field seem feasible and attractive to those employed without disruption to their occupations.

v. Continued Post-Graduate Research activities should be encouraged on topics related to the field of occupation to those who are employed and also research and development on distance education with relevance to the local context.

vi. Distance Education can either be imparted purely on broadcasting over the air or purely on correspondence or on a mixture of both with student face-to-face contact at Centres.

vii. The model adopted by the Open University of Sri Lanka for the programmes of study in Science & Technology is a unique one and could be considered most suitable for developing countries.

APPEXDIX 1

REGIONAL CENTRE
PROPOSED REGIONAL CENTRE
STUDY CENTRE
PROPOSED STUDY CENTRE
JAFFNA DISTRICT
MANNAR DISTRICT
VAVUNIYA DISTRICT
TRINCOMALEE DISTRICT
ANURADHAPURA DISTRICT
PUTTALAM DISTRICT
POLONNARUWA DISTRICT
BATTICALOA DISTRICT
KURUNEGALA DISTRICT
MATALE DISTRICT
KANDY DISTRICT
AMPARA DISTRICT
GAMPAHA DISTRICT
KEGALLE DISTRICT
BADULLA DISTRICT
NUWARA ELIYA DISTRICT
COLOMBO DISTRICT
MONARAGALA DISTRICT
KALUTARA DISTRICT
RATNAPURA DISTRICT
GALLE DISTRICT
MATARA DISTRICT
HAMBANTOTA DISTRICT

DISTANCE EDUCATION IN INDIA: APPLICATION OF MODERN TECHNOLOGY

K.K. Sud

In most of the developing countries like India, the social demand for education has consistently run ahead of the provision of resources. Until recently, the traditional class room method of imparting education could meet the public demand as higher education then was the monopoly of the elite and the prosperous section of the Indian society. However with the passage of time and awakening among masses, the elitist concept had to be discarded, because one of the important social objectives of the modern society is to democratize education by extending and equalising educational opportunities for all sections of the society.

The formal system of education could not possibly achieve this objective unless it was made very extensive. And making it extensive would involve heavy costs which no developing country can afford. Another constraints of formal class room system of education is that it can admit only the whole time students. It cannot satisfy the aspirations of millions of working men and women who want further education. Even in highly developed countries, the growing demand of the people for continuing education cannot be met by the formal system. It is, therefore, absolutely necessary for developing countries like India to think of an alternative system of education to meet these challenges. And distance education seems to provide the solution to this problem. Distance education was launched in India in 1962 with following objects:-

1. To provide an efficient and less expensive method of educational instruction at a higher level in the context of the national development in India.

2. To provide facilities to pursue higher education to all qualified and willing persons who had failed to join

regular university courses due to personal and economic reasons or because of their inability to get admission to a regular course, and

3. To provide opportunities of academic pursuits to educated citizens to improve their standard of knowledge and learning through correspondence education without disturbing their present employment.

The success achieved at Delhi University inspired other universities to initiate their study programme through correspondence and up to now a significant number of universities in India have adopted this system of importing instructions.

Distance Education system has a great sociological justification in this context as it can help not only in extending educational facilities and making education easily accessible, but also in equalising educational opportunities. It can carry education to varied and dispensed student population, even in remote rural areas, and provide instructions at all levels. It is thus a more democratic system that can respond to varied educational needs of society.

At present, distance education has come to be recognised as a multi-media teaching-learning system. Since the learners in this system do not have to come to the class-room, except for short face-to-face contact, they study most of the time at a distance, away from the teacher and the institution. It is for this reason that mere printed correspondence course material was not considered adequate to provide effective teaching-learning to the learners, although the printed course material will continue to be the mainstay of imparting instruction to the distant students in all Distance Education Institutions including the recently established national Open University at Delhi.

The tremendous developments in the field of communication technology in the World offers great possibilities for integrating appropriate communication media into the Distance Education System. These would help in reducing time and place restrictions on the learners and prove useful adjuncts of the printed word.

Unfortunately this is one area which has not received proper attention of Distance Education Institutes and the Universities which are running these institutes and the bodies responsible for the over-all supervision of this innovative system of education. This is for me to share with distance educators assembled here to discuss the various devices of Communication technology which are being used by Open University and Distance Education Institutes run by various universities in India. Most of these innovations have proved useful in imparting knowledge and skills to the distance education learners. In most cases these audio-visual programmes are put across to supplement or re-inforce instruction imparted to the learners through the printed course material. However, instruction for some courses is provided exclusively at audio-visual programmes as in some universities. One distinct advantage of the Distance Education audio-visual programmes is that apart from the students who enrol with the Distance education institutes, quite a number of other persons including students in the formal system, also benefit from these programmes. The use of communication technology therefore, can help in wider spread of knowledge even among those who may not be interested in studying for a degree, diploma or certificate.

We, in India, realise that the age-old system of class room teaching is losing its glamour and credibility. Moreover, education system in the modern age has to cope with the educational demands of adults because education now has to be a continuing life-long process. Then there is the upsurge against elitism in the formal education system which cannot be ignored. We have got to democratise our educational system

in order to extend and equalise opportunities for education at all levels so that it is within the reach of all those who want it. The formal system cannot cope with these new demands. That is what explains the fast development and popularity of Distance teaching learning system. The last two decades have brought this system to the fore-front, and research and developments in communication technology related to distance education has become significant and this has generated a lot of interest among distance educators in the application of these new media to their teaching-learning processes.

Although the highly sophisticated communication technology may not be within the reach of distance education institutes in India a beginning can be made, and it must be made, if we really want our distance education system to be effective and responsive to the educational needs of our people. Of course we would have to make a judicious mix of the communication media available in our country keeping in mind their accessibility to our learners, not only in cities and towns but even in remote rural and backward areas, so that we may be able to take education to the very doorsteps of the people. The institutes of distance education by themselves may not be able to do much in this direction specially with regard to Radio and the Television, because unless the government lays down a clear-cut policy to provide Radio and TV support to Distance Education Institutes, no such programmes would be possible.

Now let us consider the various media which can be put to use for reinforcing our distance education programmes. In most of the developing countries, like India Radio on account of its wide acceptability and moderate cost, is used quite extensively for educational broadcasts and as a support service for teaching the distant learners. The only snag in this medium is that it provides just one-way communication. Some of the advantages of Radio over other media are that Radio Programmes can relate a course of study to current events and it can be altered, brought up-to-date and improved. However, lot of imagination is required to make the Radio programmes really attractive and effective.

Television is also a very attractive and useful audio-visual medium which is widely used for imparting education in the developed as well as the developing countries. But it is not as easily accessible to the people in the developing countries as the radio. However, with the installation of satellites, introduction of micro-computer based system and reduction of costs, television is bound to come within the reach of fairly large segments of our population even in rural areas. This medium is particularly useful for demonstration of laboratory experiments, etc. Some of the developed countries have evolved useful combinations, of cable TV, electronic blackboard, fibre optics and telephone. These combinations, convert the simple television set into a powerful and educational tool called the Teledon-Canadian Video System. The Video tape and Video disc are also very useful innovations which remove the constraint of viewing TV programme at set times. The British Open University has developed an extremely versatile audio visual teaching medium called the Cyclops which is based on the conventional TV set, standard audio cassettes and micro-computer technology. The Cyclops, when linked to a telephone, increases its versatility as a teaching tool. It should not be difficult for us to develop and adopt, in due course of time, these innovations of Radio and Television for imparting teaching to the Distant learners in India.

It is evident that the Radio and TV could constitute important inputs into the Distance Education programmes. Apart from being powerful aids in the learning process, the radio and TV programmes would give a phychological satisfaction to the students of listening to the live voice of their teachers and seeing them. That would impart some sort of personal touch to their process of learning. Radio and TV programmes would facilitate comprehension, enliven learning, enrich the students' understanding of the subject matter and motivate them to do some independent thinking and reading. Thus, properly planned and well-prepared Radio and TV programmes could go a long way in supplementing and re-inforcing the instruction imparted through the lessons. The UGC sponsored TV programmes

of higher education and the school broadcasts have proved the utility of these media in the teaching process. Top priority should therefore be given to the integration of TV and Radio into the Distance Education system.

However, in order to make Radio and TV programmes really effective and useful it would be necessary to:-

i. ensure sufficient autonomy in developing and broadcasting or telecasting educational programmes;

ii. provide special channels and frequencies for educational programmes;

iii. train teachers at different levels to produce good radio and television programmes;

iv. use care and imagination in selecting topics and talkers for these programmes;

v. allocate appropriate timing of these radio broadcasts and TV programmes so as to attract the largest number of students to listen to and watch these programmes;

vi. organise an expert group which should monitor and evaluate the radio and television programmes to ensure regular improvements.

Audio cassettes and video tapes are also very useful teaching media. These have an advantage over the radio and TV in that they enable the learners to have control over the learning material; they can listen or view the programmes at any time convenient to them; they can stop the cassette or video tape at any stage, go back over any section of the cassette or tape as often as they need and use it again for revision or recall. Phonograph records and flexidiscs too are good innovations and are cheaper and more easily accessible. Education film strips and films could also be very suitable and effective media for imparting education.

The computer is an excellent device that can be usefully employed for evaluation of students' assignments. A fully developed Computer-Assisted Education System (CADE) can be used for correction and comments on students' replies to multiple-choice questions with carefully selected distractors. In this system, an optical reader 'corrects' the students' replies, after which the computer selects relevant comments and explanations from among a great number of those programmes and stored for the purpose. The computer also checks and refers to the individual student's earlier performances and achievements when parallel or similar questions were attempted. A mistake in the student's answer or unsatisfactory answer elicits different comments from the computer, depending on the way in which the student has misunderstood or wrongly combined items. Sometimes even correct replies are commented upon to underline something important or to strengthen the motivation of the students. Encouraging and counselling comments based on the overall performance of the students are also provided by the computer. All this is typed by the computer into a personal letter addressed to the individual student. However, this use of the computer is restricted to the objective assignments of the multiple choice type. Therefore, a number of subjects, themes within subjects and general types of learning e.g. free problem-oriented learning would require line tutors. Even the multiple choice questions which can be marked by the computer are not always suited for all kinds of learning outcomes. The greatest advantage of computer marked assignments is that it greatly reduces the average turnround time of assignments. The computer also eliminates the chances of erratic marking which has become the bane of our examination system. The computer ensures uniformity in evaluation. The computer can play a very important role even in the organisational set up of Distance Education institutes, which have large enrolments.

Development of computers is an important contribution of the bionics science where methods of creating mechanical systems are investigated and computers are going to be common market

products in our technologically advanced society. With the changing socio-economic structure and increasing consciousness for quality of education, there comes an era of automation and computers in education. It has been observed that Computer Assisted Instruction (CAI) permits many pupils to interact on an individual basis with teaching material stored in the computer. It is possible that students may have teaching and advice and designed schedule while solving problems or working through practical task. Even it is possible to design strategy based on inquiry guided discovery or laboratory mode. Various peripheral devices like slides, film projectors, tape recorders can be easily controlled by computer. There are some important systematic studies which have been conducted in some of the developed and developing countries to use computer for educational purposes. Computer aided learning can handle many students individually and allow them to proceed at their own pace and level of achievements. Computer assisted instruction can be used in the distance education system where provision of learning centre of resource centre exists. Computer controlled telecommunication and television project can be used for the computer assisted instruction on various topics selected on the basis of interest and importance. Even popular learning packages could be prepared for the learner which could be used for education purposes on a computer terminal of computer centres. Production of mini-computers and microprocessors on a large scale may be helpful for computer assisted instruction imparted for the sake of distance education. It is possible for computer manufacturing firms to design special computers for distance education systems suitably priced which could be afforded by the community residing in rural and remote regions. In future it would be possible to have a common computer terminal for the number of Resource centres working under the distance education systems. Even faculty members working in the management pointed out that computers' application in management and administration got momentum with fastest speed due to advancement in computer hardware and software technology.

Distance education systems can use computer centres for professional development, educational administration of functions involving data analysis relating to admissions, examinations, facilities, inventory. Computerised management systems could be developed for the effective planning and management of Distance Education Systems. Management information systems thus developed should be useful for group members as well as group leaders which would be helping them to take appropriate decisions for the various problems they come across in context of policy framing situations and routine matters. Proper communication channels should be developed to provide up-to-date and exact information to the group members (policy makers, top managers, middle managers, etc.). This requires flow of information about resources (time, finances, manpower), rules, regulations, job performance and various types of records. Computerised management system will be a great asset for distance education systems to be used effectively to maintain managerial harmony.

Satellite Communication and Distance Education Systems

Distance Education systems can work efficiently with the help of the satellite communication. This was suggested by late Dr. Vikram Sarabhai who realized the importance of satellite television as a means of communication and education relevant to India's developmental needs. It is a well known fact that hundreds of scores of rupees are needed for space programmes It is possible to justify the accountability aspect of this considerable amount if we consider educational, public awareness and social consciousness programmes by this noble means for social and economic development of our country, keeping in view its size, population and area.

The Satellite Instructional Television Experiment (SITE) was launched during August 1975 - July 1976 using the American Satellite ATS-6. The success of the site project inspired the space scientists to build INSAT-TV broadcast system. For the same purpose INSAT-1A (launched from USA on 10th April 1982 by NASA) and INSAT-1B (launched from USA on 30th August 1983)

were launched in the orbit. On the basis of the various tests INSAT-1B could be called operational on 15th October, 1983. Now the space communication has become a million dollar (per year) industry and is still growing. The direct broadcast satellites have proved to be cheaper than the present conventional system of communication.

Distance education systems can make use of the television for providing education to the masses. This requires careful planning and management. It is better to have preliminary survey of the needs of the society on the basis of region and their socio-economic balance. Social set up of the people living on high altitudes is quite different from the people living in plains or coastal belts of the country. Of course certain programmes may be useful to whole of the society. Teams of planners for these types of programmes will consist of educationists, psychologists, sociologists and communications experts who have wider outlook about the regions of this country and their problems. Interested educational and research organisations could be invited for this noble task. Unplanned and ill-organised programmes selected randomly may damage the whole cause. Unfortunately the present TV programmes regarding information and education are not attracting the masses and day by day motion pictures made for commercial purposes are becoming sole basis to justify Doordarshan. The whole TV system should be reorganised so that distance education systems can work efficiently. Space Application Centre (SAC), Ahmedabad is one of the important agencies working under the set-up of Indian Space Research Organisation (ISRO) for telecommunication and TV broadcasting. SAC should take pioneering steps for distance education activities in collaboration with various universities and good institutions. It should work for effective planning and implementation of distance education programmes. It can also be a co-ordinating machinery for different agencies working in this direction. Important organisations working for the cause of expansion of education and having much workload in their respective fields are expected to co-ordinate and provide cooperation for

developing distance education systems. It is better to start a National Institute of Research and Training for Distance Education. This institute will be doing research work for distance education along with training the human resources for distance education system. UGC, SAC Ahmedabad, Department of Science and Technology (DST) and the Association of Indian Universities (AIU) can provide assistance to this national body in various ways. It will provide guidance to various distance education systems of future. This institute may have following departments and centres:

1. Human Resource Development for distance education systems;
2. Mass-Media Research Department;
3. Library and Documentation Development Centre;
4. Centre for Development of Self Instructional text Materials;
5. Computer Application Centre for Distance Education Systems;
6. Research and Survey Department for Distance Education Systems;
7. Consultancy Centre; and
8. Evaluation Unit.

Distance education systems of the future are expected to cater to the needs and aspirations of various categories of learners with varying attitudes, aptitudes and interests on a reasonable cost with appropriate time adjustment strategies. They should be in a position to produce quality and excellence in our human resources development programmes. Careful planning and effective management strategies are required to design workable distance education systems for the future.

Telephone

Telephone has tremendous potential for providing two way interaction between the learner and the teacher, as also among the learners themselves. This technology is particularly useful when students are scattered over vast areas and in countries where there is a shortage of specialists. Some of the latest and significant innovations of telephone are Tele-tutoring and Tele-conferencing. According to the world bank study published in 1982, telephone has, in recent years,

come to be used for direct teaching in the developed countries.

The study has listed six different methods in which telephones can be used for teaching.

1. Tutor-learner. When it is not possible to provide group teaching because of shortage of teachers or insufficient number of students, the learners are allocated to telephone tutors;

2. Learner-learner (self-help) to facilitate interaction among learners.

3. Tutors-learners in a group. In case of shortage of tutors and long distance involved in reaching the learners, a tutor is linked to a class by means of loud speaker telephone in the study centre. The students can also communicate back to the tutor by means of microphone linked to the study centre telephone. In this way a tutor can cover several groups of learners consecutively without having to travel.

4. Tutors-learners in several groups; by this method a teacher can lecture up to 200 classes or over 40 000 students simultaneously. This system has been successfully tried by Wisconsin University in the USA for its extension programmes.

5. Conferencing (with Tutor): This method can help in arranging telephone seminars without students or tutors having to leave their homes, if they have telephones. Seven different numbers can be linked simultaneously with one another and every one can speak to and hear every one else. Alternatively, seven study centres could also be linked together.

6. Self-help conference calls. This method is exactly the same as method 5 but there is no tutor involved.

Unfortunately, this telephone technology is not available in India and while choosing the communication metia, we must ensure that they are within the reach of our students. Individually, all the students may not have access to these media except the Radio. It would, therefore, be necessary to provide proper facilities for students at the study centres. Another way could be to organise mobile learning centres as tried by North Island College in Vancouver Island, Canada. The mobile centres should provide facilities for viewing and listening of videos, audio cassettes, flexi discs, etc. as also library and laboratory facilities. Such a mobile learning centre can travel to various places on a regular shedule and students can be informed in advance so that they may take full advantage of it. These mobile units serve the purpose of publicity vans also and enthuse a number of persons in the areas visited to enrol for various courses.

Thus we see that we now have a wide range of communication technology which can bring about a meaningful revolution and improvement in the teaching learning processes. Although developing countries may not be in a position to make use of all these innovations, they should chalk out a phased programme for integration of these communication devices into their educational system to make it more effective. In the first phase, we should take immediate steps to introduce such communication technology as are available to us e.g. Radio, Television, Audio cassettes and Video tapes. In the second phase, we should aim at developing and adopting the various adaptations of Radio, Television and cassettes, such as Radio conference/tutorial facilities, Telidon, Video tape, Video disc, Cyclops, etc. For the third phase we should keep an eye on the future and try to develop the latest and sophisticated communication technologies in collaboration with the developed countries. The UNESCO, various Education Foundations and International Educational Organisations should launch special programmes to help the developing countries to integrate the latest communication technologies in their instructional programmes.

The government of India is now aware of the importance of Distance Education and new communication technology for imparting education at all levels. This is evident from the emphasis on these sectors in the New Education Policy documents. The setting up of Indira Gandhi National Open University is the outcome of this awareness on the part of the government. Six State Governments - Andhra Pradesh, Kerala, West Bengal, Bihar, Madhya Pradesh and Uttar Pradesh have already decided to set up State Open Universities. I am sure other states would also be motivated to organise distance education on a sound footing and provide proper funding, support and recognition to this innovation system.

Distance Education has come to be recognised as an academically viable system for imparting higher education and is most relevant to the educational needs of our country. This system can ensure vertical as well as horizontal mobility to the motivated learners even after they take up employment. And it has the greatest potential for integrating new communication technologies in the teaching-learning processes. Distance education in a number of developing countries like India has adopted the multi media approach for imparting higher education and integrated various communication media to make teaching learning processes more effective and interesting. Over the last decade and a half there have been very significant developments in this regard in a number of developing countries also, such as India, Pakistan, Sri Lanka, South Korea, Indonesia, Thailand, Malaysis, Spain, etc. This system has greatly helped in extending the equalising educational opportunities for all sections of society. It has taken education to the very door-steps of people even in remote areas. Distance education has the greatest social justification and deserves whole-hearted support and generous financial backing for extending the widening the horizons of higher education, as well as continuing and adult education. If we support the Open Universities and Distance Education institutes to develop and integrate new communication technologies in their teaching-learning techniques, the traditional universities and colleges too

would be able to gain from their experience because ultimately they too will have to inverweave relevant communication technologies in the traditional face-to-face teaching methodology. The sooner they do that the better would it be. I am sure, the establishment of Indira Gandhi National Open University would, in due course of time, provide guidance and help to the states Open Universities and Distance Education institutes in adopting multi-media teaching approach. But the state Governments must also provide financial support to such institutes in their States. We must march with the time and accept the relevant innovations of communication technology that can help in making the Distance teaching-learning processes more effective and meaningful.

However, we in India are faced with certain problems in matters relating to use of technology in the process of distance education.

The Seventh Five Year Plan put the level of illiteracy in the country at as high as 63%. About 90 million illiterates in the age group 15-35 years are to be covered by 1990. The Indian education scene covering the elementary, secondary, university, technical and adult education is faced with a staggering backlog. This formidable task will take money (budget allocation for education has been increased from 3500 million to 8000 million for 1987-88) and it requires effort. Both will be well spent if we apply intelligent research, imagination, bold approaches and genuine dedication. The country has no choice but to provide for rapid proliferation of learning opportunities through distance education utilizing new media technologies. This way the abundant human resources would be harnessed and their capabilities improved for development.

The mass media performs three major educational functions of socialization, informal education and formal instruction. Distance education with the utilization of mass media and new technology is the principal means by which learners could be reached in thousands spread over a vast geographical area.

Such an educational system is also apparently free from the common psychological barriers to effective teaching, known as verbalism, referent confusion, day dreaming, hinted perception and physical discomfort. Besides, keeping in view our meagre resources as compared to the task at hand, media based distance education is cost effective than in school instruction. In such a situation, non-formal and open learning systems are, therefore, the best alternatives available.

In distance education itself, the role of the teacher, the role of the classroom, the nature of the learning process itself must also be re-examined in the light of new technology. I believe that far from being replaced, the teacher would increase in importance only with his function changes. Technology will assist and support many education functions thereby increasing the productivity of teachers at large and freeing them of work of clerical and recordkeeping nature and the elementary task of simply presenting information for student consumption.

Lack of Media Facilities

Coming back to India's massive educational needs, these require extensive and intensive use of mass media. Despite the adoption of the resolution of the National Policy on Education in 1968, the development and utilization of instructional technology has lagged way behind. Media applications are yet to be fully exploited for educational purposes.

This is specially true in the case of the distance education institutes of directorates of correspondence courses as they are called. Media facilities hardly exist. In case of mass media, most of the time, the institutes chiefly use only the medium of radio for educational broadcasts through the All India Radio (AIR).

If we have to expand educational opportunities quantitatively and qualitatively at a quicker pace then not only new non-traditional courses would have to be introduced through distance education but also the potential of new communication technolo-

gies have to be exploited for this purpose. Here the role of mass media cannot be over-emphasised. The National Information Policy (1985) also acknowledges the use of mass media, particularly the electronics media, in imparting education, providing motivation for social change, influencing attitudes and traditional practices and thus creating a climate for development.

Our panacea in distance education may not lie in the immediate adoption of such technologies but to fully test their possibilities: programme results should be assessed in the light of adequate evaluation and identification of causes for failure or success. And if changes in instruction do not lead to improved results, to lowered unit costs, or to other educational benefits, perhaps they should be reworked or we may seriously consider and implement the simpler and less expensive technologies in the Indian context.

But we find that even this is not being done at present. Though we do talk of the utility of non-broadcast media like the audio and video cassettes, video discs, videotex, personal computers/ microprocessors, television and telephone I think in our case, the information revolution is yet to proceed the so-called intelligence revolution.

Absence of Media Centres and Media Specialists

Though the distance education institutes are contributing in a big way towards the achievement of educational objectives, still these are primitive in their approach. Hardly any of such institutes could boast of an educational media centre worth the name. It appears that the multimedia learning environment is yet to find a place in our distance education system. Equipment apart, barring a technician or two, most of the institutes even do not have the required professional media manpower.

The faculty members, though specialists in their respective fields, have little or more appropriately no orientation in

Instructional Technology or media application in distance education. Besides the print medium, most of them at best have learnt not through instruction but largely by sheet experience the use of just one of the mass media i.e. radio.

Again most of them still do not look beyond the print medium and the classroom even though they are placed in a different situation at present. In fact, a beginning could be made with the teacher orientation itself. It calls for a new role of teacher vis-a-vis development of new skills in media applications in distance education. This acquires urgency in view of the fact that machines will never replace the teacher, as I had implied earlier, just the role of the teacher in the present context would be changed, and changed for the better.

This is important even otherwise. To put it lightly, it has been interestingly said that the human has three incomparable advantages over machines: it is highly mobile, it requires relatively little maintenance for an average of 50 years of service, and finally, its greatest advantage, it can be mass produced by relatively unskilled labour.

But at the same time it should not be forgotton, as Thorndike wrote as long ago as 1912: "A human being should not be wasted in doing what forty sheets of paper or two phonographs can do. Just because personal teaching is previous and can do what books and apparatus cannot, it should be saved for its peculiar work. The best teacher uses books and appliances as well as his own insights, sympathy and magnetism."

Increased Personal Contact Through Use of Media

With the development of a range of media and accessibility in libraries and the home, the personal relationships between teacher/communicator and student have more potential for development now than ever before. With more time provided by by electronic teaching aids, teachers will be able to give attention to their problem students. Personal counselling will help more students over rough periods and prevent them from

dropping out. Also teachers will have the opportunity to develop courses that will be attractive to many students who lose interest in the limited traditional courses.

Contribution of Media and Technology in Distance Education: Some Suggestions

Based on the above analysis, some suggestions are made to increase the contribution of media and technology in distance education. First, budget provisions should be made in the correspondence institutes for the recruitment of professional educational media personnel in addition to the regular staff.

Secondly, fully equipped Media Centres should be set up in the institutes which apart from their normal functions should also plan and perform media research and evaluation.

Thirdly, there should be pooling of resources among correspondence institutes on a national and regional basis in order to minimize cost of designing instructional systems and designing instructional facilities. The centralized planning is also called for both to avoid duplication of effort and to insure compatability of the systems from one institute to the other. In other words, present and prospective advances in educational technology should be applied on a nationwide basis. Thus while retaining their local autonomy various institutes would be enriched and improved by the resources of national educational research.

Fourthly, centralized tape libraries should be set up on regional bases. The local institutes could select, for example, an entire course of instruction, or specialized lectures prepared by the best teachers in specific fields.

Fifthly, the teachers must learn new roles. For the faculty development programmes should be launched at the outset to provide (re)orientation to teachers in the use of media and new technology in distance education.

Sixthly, the intimate involvement of the computer in the educational process itself has been well recognised. With the availability of resources, increasing use of computers is envisaged for research and computational purposes in distance education. The day is not far off when every respectable institute will have a computer centre as routinely as they now have libraries (which, incidently, will soon be automated). Computer application would alsc help in improving the overall management through speed and efficiency in registration of students as well as logistic and accounting purposes. The larger institutes with greater needs should, therefore, plan and make provision to have their own computer or have access to one through time-sharing.

Last but not the least, in the context of INSAT utilization, State Institutes of Educational Technology (SIET) should be set up in all the states. Besides, some of these should be upgraded as regional centres of educational technology for the production of soft ware for educational technology and training of personnel engaged in distance education.

To conclude, it can be said that with increasing opportunities for media-related learning experiences, application of new technologies in distance education and massive educational needs, the correspondence institutes would have to shed their complacence and undertake greater application of mass media and new technologies with proper planning of material and human resources to assure maximum educational opportunities for a greater number of people.

THE TEACHING OF LIFE SCIENCES AT EVERYMAN'S UNIVERSITY

Dr Ruth Arav
Everyman's University, Israel

The goal set by the founding fathers of Everyman's University was to bring it into the student's home, and enable him to study at university level in his free time without having to remove himself from either his job or his home. Everyman's University achieves this goal by preparing material for self-study and sending it to the homes of students who can then learn the various academic subjects on their own.

In this respect we approached the writing of courses in natural and life sciences with some misgivings: this is, after all, a field of learning that involves laboratory work and field excursions. Could our faculty teach people in their homes and still maintain all elements of a proper academic course?

Now, ten years after launching its first courses, including "Introduction to Natural Sciences" and "Introduction to Life Sciences". Everyman's University is offering 31 courses in natural sciences (physics, chemistry, geology) worth 22 credit points and 30 courses in life sciences (biology) representing a total of 20 credit points.

The life sciences course-system was constructed in such a way as to offer students a most representative and up-to-date picture of the field of biology and at the same time to enable them to carry out experimental work.

TYPES AND LEVELS OF COURSES

Courses in life sciences, like all Everyman's University courses, are divided into several categories, by level:

a. Introductory Courses - Such a course "Introduction to Life Sciences" first acquaints students with the subject.

b. Intermediate Courses - correspond to those taught in the first and second year at other universities and provide the broad infrastructure required for the study of more advanced and specialized courses. Examples: "Biochemistry 1: Proteins - Structure and Function", "Cell-Structure and Function" and "The Microbial World".

c. Advanced Courses - correspond to the second and third year. Examples: "Immunology" and "Topics in Human Physiology".

d. Advanced Seminar Courses - these are the equivalents of seminar courses at the end of the third year at other universities. For example: "Heredity and Cancer", "Body Heat and its Regulation".

The majority of courses consist of study units designed for self-study and are supplemented by assignments. There are also tutorial meetings at which problems encountered by students are clarified.

Exceptions to this rule are the advanced seminar courses: Here the student receives a certain amount of comprehensive background material (study units of Everyman's University or of the Open University in England, articles in English or chapters from an advanced book) which he reads at home. The student them meets with an expert tutor (a senior lecturer at Everyman's University or at another university) and chooses one of the proposed themes for his seminar paper. In order to write the paper, he is again required to read a good deal of professional literature and, in some courses, to do advanced laboratory work and lecture about his subject before an audience of his peers, in the presence of his tutor.

Students of life sciences must also acquire a basic knowledge of physics, chemistry and mathematics, by taking courses such as "Introduction to Natural Sciences", "Pathways in Chemistry", and "Calculus for Science Students" or "Introduction to Probability and Statistics for Science Students".

A number of solutions have been devised to cope with the problems of incorporating laboratory work and field excursions into intermediate level life science courses:

a. Kits for home experiments: Many courses in life sciences such as "Plants and Vegetation". "Biochemistry I", "The Microbial World", provide for the use of home experiment kits. These kits contain instruments, materials and appliances for home experiments, plant collections, balls and sticks for the construction of molecular models, steoroscopic eyeglasses for spatial observation along with detailed operating instructions. Quite often, reports and analysis of the outcome of home experiments constitute part of the course assignments.

b. Laboratory meetings at institutions where the necessary facilities are available: Everyman's University has agreements with life science departments at universities, research institutes, colleges and teachers' training institutions, which are equipped with the proper laboratory facilities.

   There, EU students carry out experiments under the supervision of an EU tutor. For the courses "From Mendelism to Genetic Engineering", "Introduction to Life Sciences" and "The Vertebrates", laboratory meetings are held in the laboratories of several teachers' training schools and the Biological Institute in Haifa. Some of the meetings for "Cell-Structure and Function" and "Human Physiology" courses take place at the laboratories of Tel-Aviv University.

c. EU students joining parallel groups from other universities, to conduct laboratory experiments. The AU group has its own tutor who also corrects and grades the reports. This method is new and has been successfully applied in the course "Immunology Laboratory".

d. A central student laboratory in the EU building: Resorting to the facilities of other universities for the purpose of operating EU students laboratories has not been without difficulties which kept cropping up over the years.

EU needed its own student laboratory, both for the testing of new experiments and for the students themselves. Such a laboratory was indeed set up and has been operating at full capacity with great success. Since February 1981, the laboratory meetings for many courses have been taking place in the central laboratory, as in the case of "Bio-Chemistry I", "Cell-Structure and Function" and "Human Physiology".

e. We plan to develop "dry lab" courses, in which students receive results of various experiments and are asked to analyse and explain them, and draw conclusions. One such course in physical chemistry - "Analysis of Experiments", has been in operation at EU for some time, with considerable success.

SPECIAL COURSES IN NATURAL AND LIFE SCIENCES

With time, the team was beginning to feel that the amount of laboratory work and field excursions included in the courses, should be increased to allow students to experiment directly with the studied objects and with research methods in life sciences. To meet this goal we created special laboratory courses and field courses.

a. Laboratory Courses

They accompany the theoretical courses and consist mainly of laboratory experiments related to the corresponding theoretical course. The students take home background material for experiments, carry them out at the lab meeting and sum up the experiments in a laboratory report. At special sessions they discuss the conclusions and applications of the experiments and at the end of the course are examined.

b. Field Courses

Field courses consist mainly of excursions during which the students observe plants and animals in their natural surroundings. These courses too are supplemented by a great deal of background material and involve the writing of detailed reports and a final examination.

INTERDISCIPLINARY COURSES

Comprehension of the various life sciences is dependent upon a fundamental knowledge of these subjects. This is universal and thus most natural and life science courses resemble their counterparts at other universities, except in their being designed for self-study. However, EU also offers several original interdisciplinary courses. One such course is "Symmetry" which discusses the notion of symmetry in mathematics, chemistry and biology. Further examples: "Human Physiology" deals with physiological systems and mechanisms of the human body from an energy balance point of view and "Oceanography" examines the chemical, physical, geological and biological aspects of oceans. Other interdisciplinary courses studied by students of both natural and life sciences are "Philosophy of Science" and "Selected issues in the Philosophy of Science".

Many of EU's courses are used as course material or recommended reference literature at Israel's other universities. In the field of life sciences entire courses or single units are purchased at the beginning of each semester by students and teachers from every university in the country.

THE STUDENTS IN LIFE SCIENCE COURSES

Here are some statistics pertaining to students of life sciences at Everyman's University. About a quarter of all registrations in the academic track are for courses in natural and life sciences and mathematics. Of these, one quarter are in the field of life sciences. By way of illustration: in terms 17/18 (academic year 1984/85), out of a total of 20,750 registrations for academic courses, 4749 (29%) were

for courses in natural and life sciences and mathematics (some of which are prerequisites for the study of biology), 1059 thereof (approx. 5% of the total) were for courses in life sciences. (Note that registrations are not equivalent to students. A student may enrol for one or two courses each term).

Of the students who completed the requirements for a B.A. degree, over 25% focused on natural and life sciences and mathematics, half of them in the area of life sciences. These figures show that the share of life sciences students among candidates for a degree is higher than their share in the whole student body, and that much more of them persevere in their studies until they obtain the degree. In this connection one should mention the extensive personal counselling offered by EU faculty members. See also the chart for curriculum planning in life sciences.

Prof. Avinoam Adam has conducted a personal, as yet incomplete follow-up of life sciences graduates: Out of 42 graduates who had received the BA degree up to term 20, 18 have continued their studies for a second degree in life sciences - eight at the Tel-Aviv University, four at the Technion, two at Bar-Ilan University, two at the Faculty of Agriculture, one at the Hebrew University and one at the Weizmann Institute. We know of at least four who have completed their second degree studies and two of them have continued directly for a PhD. All these institutions, with the exception of the Tel-Aviv University Life Sciences Department, had demanded very few complementary courses. At Tel-Aviv University Life Science Department, our students are often required to complete about 700 hours (the equivalent of one academic year).

THE LIFE SCIENCE TEAM

The team consists of four senior and ten junior EU faculty members. This small team writes and produces courses, supervises instruction all over the country and endeavours to overcome the perennial problem of study material becoming obsolete

and in need of rewriting. In this effort, team members are assisted by many scientists from other universities who act as consultants (and sometimes writers) on various subjects, or as tutors and instructors for different courses. In addition to the development of courses and teaching duties, all members of the team are engaged in research work, for which they use laboratory facilities at the Tel-Aviv and Jerusalem universities. Naturally, faculty members can devote only part of their time to research. They usually spend two or three days a week in the various research laboratories they have chosen. They also attend professional conferences, go on sabbaticals and publish the results of their work in scientific journals. Some of our team members are particularly interested in certain theoretical aspects of biology, and we hope they will form a research group in these subjects.

DISTANCE TEACHING AS AN INTEGRAL PART OF THE IN-SERVICE EDUCATION OF MATHEMATICS, PHYSICAL SCIENCE AND BIOLOGY TEACHERS

JAN NEL
DIRECTOR OF IMSTUS, UNIVERSITY OF STELLENBOSCH

AND

DAVE FINNEMORE AND STEVE RHODES

TUTORS OF THE FITMAST PROJECT OF THE
UNIVERSITIES OF STELLENBOSCH AND THE WESTERN CAPE

The Institute of Mathematics and Science Teaching at the University of Stellenbosch (IMSTUS) has collaborated with the Cape Education Department in presenting Mathematics, Science and Biology teacher development programmes annually since 1978.

The impact of these courses was noted by Subject Advisors and Inspectors from the Department of Education and Culture and they suggested that IMSTUS repeat the performance for their own teachers of Mathematics, Science and Biology.

Through its Resource Centre under prof M.C. Mehl, the University of the Western Cape was invited to join forces with IMSTUS. A tripartite 10- year contract was signed, involving the two Universities and the Department of Education and Culture. Emphasis was to be on improving the qualifications of that Department's teachers of these "scarce" subjects.

A much valued grant from Shell (SA) Pty Ltd allowed appointment of the two gentlemen who will follow me in this presentation, to work full-time as tutors in the FITMAST Project.

AIMS OF IMSTUS AND FITMAST COURSES

Although the needs for further education and teacher development differ slightly in the IMSTUS and FITMAST Projects, both have the same broad aims. The differences in emphasis (updating versus upgrading) arise from the fact that the course participants of the IMSTUS Project are from the Cape Education Department (which foots the bill in their case) and they require a less qualification-orientated course than their counterparts, simply because they are better qualified for general secondary teaching. In the FITMAST Project, however, we definitely focus on credits for diplomas and degrees, with the knowledge that, besides anything else, teachers' salaries are qualification dependent.

OUR AIMS IN A NUTSHELL

* The IMPROVEMENT of the QUALIFICATIONS of those who CURRENTLY teach either Mathematics or Science or Biology.
* The IMPROVEMENT of the COMPETENCE and the CONFIDENCE of course participants in the teaching of one or more of these subjects.

DUALITY

At the outset when setting ourselves these aims, we were AWARE of an element of DUALITY being built into them, as I have mentioned above.

Some of our course participants are urgently in need of improved qualifications (degrees and diplomas) for salary purposes. Their courses have to match the *standard* university undergraduate courses. Approved combinations and constellations of such courses may earn them

enough credits for a diploma or degree to be awarded. But this could mean that their CLASSROOM TEACHING of Maths or Science gets VERY LIMITED ATTENTION during their course.

On the other hand, one could have courses which emphasize the IMPROVEMENT of THE TEACHERS' CLASSROOM PERFORMANCES at the expense of their more advanced perspectives on and knowledge of their subject. Consequently they do not have considerable CREDIT VALUES as regards their QUALIFICATIONS.

In my opinion, TERTIARY EDUCATION SHOULD PURSUE THESE DUAL AIMS IN THE TRAINING OF SECONDARY TEACHERS. Sometimes the teachers' field of study has nothing whatsoever to do with what he is teaching, but he still gets "QUALIFIED"!! These are other issues to be resolved at another time.

HOWEVER, WE ACCEPTED THE CHALLENGE OF THIS DUALITY OF PURPOSES. WE ARE WORKING TOWARDS REALIZATION OF BOTH OF THESE AIMS.

STRUCTURE OF OUR COURSES

The annual courses offered by both the IMSTUS and the FITMAST Projects, ideally have SIX PHASES, viz.

- An ORIENTATIONAL PHASE (3 months: Oct - Dec)
- A SUMMER SCHOOL (3 weeks: January)
- DISTANCE TUITION (1st series: Feb - May)
- A WINTER SCHOOL (2 weeks: June)
- DISTANCE TUITION (2nd series: July - Sept)
- EXAMINATIONS (2 papers in November, or one after each semester)

Teachers who are selected study ONE subject course per year. This arrangement is necessary so as not to further overload the in-service teachers who comprise the target group. This does, however, imply that it takes us two years to produce a teacher qualified to teach Physical Science or Biology or Mathematics up to matric level.

RESIDENTIAL PHASES

In order to get a clear picture of the functioning of our distance tuition programmes, allow me to show briefly how our *on campus* residential courses operate.

The teachers are on campus for 3 weeks in January at the *summer school* and for a further 2 weeks in June for the *winter school*. These 25 days of 6 hours each give 150 hours of contact teaching per year, which is not much less than the normal time allocated to year-long courses in university education. However, we must bear in mind that these hours have limited spread over the year.

When teaching teachers, one invariably has dual aims, as already pointed out. Because those teachers are adults and are not beginner, inexperienced teachers, one does well to make provision for them to have opportunities to at least raise their problems and to air their views. It becomes a matter of communication once more. Allow for the optimal *understanding* of the concepts in Mathematics and the Sciences and provide for intellectual activities like thinking, relating, hypothesizing, designing and concluding, and one soon realizes that we have very LIMITED TIME to teach the subject matter. Likewise, provision is also made for rich and frequent experiences in

the laboratory. Generally speaking, the teachers on our courses have not been trained to teach Science through practical work nor to teach Mathematics by relating abstract ideas to practical situations. This point will be referred to by my colleague.

I think I have said enough to show that our courses need a further component to complement the residential input. What we do at the summer and winter schools must needs be reinforced by the distance tuition.

Obviously there will have to be some consolidation of the work done under pressure of time, but it is more than just that.

THE ROLE OF DISTANCE TUITION

In both Projects, there has always been the real danger of our focussing and relying too much on the lecturer-to-small group teaching at summer and winter school.

In this case, distance tuition cannot play its optimal role in the development of our teachers. By way of illustration; in the past, some course participants have tried to limit their inputs to the two residential periods of contact teaching, submitting no assignments at all. With few exceptions, such efforts have been unsuccessful.
Well, what could be such an *optimal role* of distance tuition? In the first instance, let us consider our more conventional types of assignments. Thereafter we will look at some more innovative ways to educate teachers over distance.

DISTANCE TEACHING BY MEANS OF CONVENTIONAL ASSIGNMENTS

The question-response mode of distance teaching is well-known. Questions may be of the recall-recap type or of the analysis-synthesis type, but I would like to emphasize that teacher training programmes should frequently contain assignments in which the teachers' understanding and comprehension is assessed.

Partial comprehension of concepts and principles is just not good enough for the Science, Biology and Maths teachers.

Once we get the course participant to return an assignment, the potentially most valuable part of the communication has started. The lecturer's or tutor's feed-back is of major importance to the learner.

Once again it becomes a matter of giving useful, effective feed-back. I am hoping to get some new ideas on these matters right here at this conference.

LESS CONVENTIONAL MODES OF DISTANCE TEACHING

In the time remaining to me I would like to mention some of the more unconventional modes of distance teaching that I am aware of. This does not necessarily imply that we ourselves have tried them out: we are merely suggesting them as examples of what can be done.

1. Teachers do need to know that more than one ordering of theorems is possible in Geometry. Similarly, they should be made aware as part of their education, that there are many ways of arranging knowledge and that one can have different points of departure.

So there is a need for MORE THAN ONE PERSPECTIVE on the content and the presentation of some topics.

This highlights a need for assignment types which require wider reading on a topic, comparison of alternatives and even experimentation in the classroom.

2. There is a need for Science teachers to work on assignments in their school laboratories. They will have to appreciate the meaningfulness of discovering patterns in science. Assignments which induce learning through experimentation in the science laboratory are certainly desirable in our teacher training. These assignments may be extended to require the design of pupils' work charts by the teacher.

3. In the training of teachers, the evaluation of classroom teaching should play a much greater role. The use of videotapes for self-evaluation and criticism as well as evaluation by colleagues is on our list of recommendations.

4. The classroom performance of a Mathematics, Biology or Science teacher can be improved considerably by making room for some classroom experiments and small scale research by teachers, as part of distance teaching programmes.

The above ideas show that we ourselves, and perhaps others in the audience who are similarly involved, have not sufficiently exploited the various possible facets of distance teaching.

South Africa needs effective distance teaching as a matter of urgency.I trust that we will address this issue and engage in some more innovative thinking and designing at this conference.

My two colleagues have been involved "at the coal-face" in the FITMAST project and have learnt much from their work at this level. I am pleased to ask them to share with you now some of the experiences they have gained during their efforts over the last 2½ years.

DISTANCE TUITION IN THE PHYSICAL SCIENCES - SOME PROBLEMS AND RESPONSES

INTRODUCTION

My particular responsibility in Distance Education is in the Physical Sciences, i.e. Physics and Chemistry.

The target group in my section of the FITMAST project is practising secondary school teachers, in the areas of science and mathematics, the majority of whom

- are currently teaching Physical Science,
- have relatively impoverished educational backgrounds.

These teachers operate both in urban and rural schools, and may or may not have degrees and/or diplomas, and their working conditions vary enormously -

- some have good laboratory facilities, some have none,
- some have a reasonable number of classes of manageable size, some just the opposite.

Undeniably an extremely heterogeneous group!

I would like to spend the short time available highlighting some of the problems encountered over the past 2½ years, and indicationdg how we have responded to them.

PROBLEM 1: The subjects are practical subjects, and require laboratory facilities to do justice to their teaching - this cannot be achieved through distance education.

The current form of the Matric exam tests only by written response, and the tendency is to de-emphasise the practical side (perhaps avoid it altogether) in the teaching approach.

RESPONSE: Fortunately our courses have contact sessions each semester which precede the distance tuition components. (In fact the distance tuition is often viewed as a follow-up, a consolidation and perhaps extension of the input given during the residential sessions.) These contact sessions take place at the University of the Western Cape, where there are very good laboratories and capable laboratory technicians.

Thus the requests from the teachers themselves to do as much practical work as possible are fairly easy to accommodate.

There is no doubt that this

- gives teachers new insights into the subject matter
- gives teachers confidence in handling the apparatus and chemicals
- prompts them, when they do have some laboratory facilities at their schools, to include practical work,

whether demonstrations or class experiments, in their teaching.

This is one indication that the benefits are being felt where they ought to be felt - in the classroom. Thus, although it is unlikely that the form of the exam will change in the foreseeable future, at least the subject is more likely to be taught from a more suitable point of departure.

Attempts are also being made now to give workshop sessions or short courses at schools, where teachers are in their own (or similar) laboratories using their own equipment. However, this has not been incorporated directly into the distance teaching programme since it cannot be done for all of the participants.

PROBLEM 2: Our participants are in full-time teaching jobs - thus, of necessity, because of their heavy workload, the part-time FITMAST study they do is fairly low on their list of priorities.

RESPONSE: On-going, periodic, frequent contact between tutors and participants is an important stimulus applied.

This stimulation takes the form of

- telephone calls, either by way of reminder or encourager before the due date of the assignment (the more pleasant, successful technique), or, after the event, as a spur to greater efforts,

- workshop sessions for groups of participants, at which they are encouraged

  to interact with one another, and to share problems, knowledge, approaches, expertise and solutions,

  to seek advice from tutors and/or lecturers.

The latter is true primarily for local participants (i.e. those in the Western Cape), but the tutors do make up-country trips from time to time for this purpose, amongst others.

PROBLEM 3: There is often a considerable time lag between when the participant receives the input on a particular topic and when he/she has to tackle the assignment on that topic.

RESPONSE: Participants are encouraged to approach note-taking and other aspects of the high-intensity contact sessions with this problem in mind, and to make every effort to annotate and become familiar with the text books (and duplicated notes) which have been/are issued to them.

Tutors make themselves available for direct assistance, and for making known (and making available) other resources (e.g. references to specific books, video-tapes on the topic in question.).

PROBLEM 4: Many participants live and work in remote, rural areas, away from or not knowing of more knowledgeable people whom they can consult, and away from reference libraries.

RESPONSE: Tutors try to keep in contact and to assist by means of help over the telephone (costly and often frustrating), by letter and through occasional visits.

PROBLEM 5: The type of assignment that can be set is limited by the nature of the participant, by his/her circumstances, and by the present nature of the FITMAST exams. Written assignments requiring written responses are the norm, and there is little variety practically possible.

RESPONSE:

- Manoeuvring within the framework is encouraged, e.g.

  * include a variety of question types such as
    - objective as well as free response or open-ended questions,
    - crossword puzzles and/or other novel items,
    - questions based on classroom experience as well as on content,
    - questions requiring critical analysis (perhaps of old exam questions, perhaps of pupils' answers containing misconceptions or common errors) as well as knowledge and understanding.

- Use of other media is encouraged, e.g.

  * compile a "guided-tour" to answering the assignment,

and/or send the feedback to an assignment on casette (audio-) tape, (my colleague will elaborate on this point),

* require participants to view a film/videotape/etc. in order to answer an assignment question,
* base a question on PLATO (or other CAL system), or give the input via such a system. This has the added advantage for those with access to PLATO to re-work the content before attempting the questions set on that topic.

PROBLEM 6: Inefficiency of the assignment cycle, i.e. compilation → distribution/issue → response → assessment → return with feedback. This can mean that participants have not yet received a previous assignment back before the next one is due for submission - this is generally a de-motivating factor.

RESPONSE: Schedules giving deadlines for the various stages in the cycle are compiled well in advance, and are issued to all personnel involved, and to participants - thus everyone's expectations are set.

Every effort is made to adhere to the schedules for those participants who submit assignments in time. Late submission is encouraged as being better than non-submission, but those marking the work are not pressured into doing so immediately for this group. However, a problem remains with lecturers who receive submitted assignments in good time, but who do not mark them

promptly.

PROGNOSIS FOR THE FUTURE

But what of the future? Some possible further courses of action include:

- mobilise SABC TV's broadcasting of educational programmes, and co-ordinate part of the distance teaching with this,
- extend the tutor network, perhaps within the project or perhaps by co-operating with other similar projects
- operate at a regional rather than a national level
- organise further laboratory-orientated short courses
- introduce study guides (an idea which will be further commented on in my colleague's presentation)

A MATHEMATICS TUTOR TO THE FITMAST PROJECT – A PERSONAL VIEW

INTRODUCTION AND BACKGROUND

I arrived in Cape Town at the beginning of October 1984 with experience dating back to Malawi in the early seventies. More recently I had been working at the Lesotho Distance Teaching Centre for two years as a mathematics course writer and then later for a further period of two years as courses editor. Frequent contact with Botswana, Lesotho and Swaziland colleagues and attendance at Distance Learning Association meetings, as well as exposure to theory and practice, had developed a "house-style" which, inter alia, was very

dependent upon the production of personalised learning materials. Research amongst our target audience had revealed such materials to be absolutely essential.

Cross-referencing left the majority of our teachers permanently entombed in one or other of the texts. This is in consistent agreement with a general observation made by Feuerstein: as an example of impaired cognitive functions displayed by disadvantaged students, Feuerstein gives the lack of, or impaired, capacity for considering two sources of information at once. (This point is taken up again later).

With this background I joined FITMAST.

My first thought when the UNISA conference was mentioned was that the FITMAST project has a very different distance education system to what I had previously been used to. To put it at the bluntest, "for the majority of lecturers involved, a list of questions on academic content is sent out to participants and about once a month some written answers are returned."

FIRST IMPRESSIONS OF FITMAST

I recount 2 only:

First: where were the instructional materials I had been used to? Days were spent in fruitless search! The wrong questions were asked. I found assignments and (a few) hand-outs given by lecturers. But where was the bulk of the self-instructional materials? Eventually I found that this existed only as individual teacher's lecture notes: the main emphasis was on the teachers being taught by the lecturers during the residential periods. Plus conventional textbooks.

Second: I was subjected to a culture shock. In Lesotho, owing to the difficulty of the terrain, "pitso's" were arranged to take into account travelling time, and meetings thus took place sometime on

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Saturday afternoon with maybe a re-run for late arrivals on Sunday morning. Whereas, in the RSA context, FITMAST participants were just a phone call away: schools, yes certainly, and most participants with a home telephone. What a contrast in accessibility!

TWO ROLES OF THE TUTOR

1. Liaison/Support in academic, logistical and personal fields.

2. Responding to teachers in attitude and facilitating teacher input.

Offices being based at University of the Western Cape is very relevant to the second role. I eleborate on two aspects only, both in connection with medium.

First the telephone: With reference to counselling, it could be argued that personal tuition and working-through-assignments go hand in hand.

In general a large number of maths and science situations fit a pattern. There is a definite starting point - the question. Then a variety of degrees of elegance - the mechanism to the solution. And (usually) one answer - the correct solution.

Up-country teachers will telephone and give me their number. I collect the file of my attempts/interpretations of all the lecturer's assignments and return the call. In this way, with the question and working before each of us, we can conduct some meaningful dialogues. Mathematics is a difficult subject to talk to people about at a distance. However, with intensive homework on both sides, it can be done.

My second reference in connection with media, is that we have experimented with audio tapes in Mathematics, Zoology and Physics, both in feedback for completed assignments an in scene-setting for problem solving.

A variety of aural and occular stimulation and a lecturer finding it

easier and quicker to talk rather than write a full memorandum to an assignment are two obvious advantages.

In regard to preparing teachers up to the point of attempting to solve a particular problem in Physics there has been notable success. The audio tape experiment was conducted in 1986. A very similar assignment was set in 1987 without this guidance.

1986 : 93% return of assignment with a mean mark of 75%

1987 : 73% return of assignment with a mean mark of 69%.

So it appears that the achievement was slightly better, but as well and more importantly, more teachers successfully completed the assignment.

THE SYSTEM WORKS

Despite their being little overt provision in our programme to help participants with learning difficulties to learn, FITMAST offers a package that works.

In the first semester of 1986, 434 distance education assignments were returned from practising teachers, and were processed by the Project. The fact that this is out of a theoretical maximum of 667 (and represents 65% returns) is irrelevant. On the other hand, the fact that this successful submission of assignments represents nearly 0,4 man-years is important. If one adds to this the estimated number of hours (as revealed by experience and as gleaned through contact with teachers,) spent where no assignment is physically returned, the thinking provoked by the distance education component is significant indeed.

So the whole FITMAST package is a working model. Admittedly, there are defects to identify and there are improvements to be made. One major area, as yet not completely tapped, is the distance learning potential.

MATERIALS DEVELOPMENT

Here teacher input is seen as essential.

What could be seen as the needs?

Local teachers are appreciative of workshops at which they can come together as a study group. But they are concerned that whilst working sessions are great for them, what about X in Oudtshoorn or Y in Kimberley? The teachers themselves suggested some form of Study Guide and they gave some indication as to content and how such Guides could be written to help their more isolated colleagues.

However, what next if we do indeed produce Study Guides?

- A booklet of prerequisite knowledge?
- Lecture notes?
- Explication of textbooks?
- Exam paper guidance?
- A more coherent, holistic view of incorporating distance education assignments?

Are we then not back to the problem of multiple sources of reference identified earlier?

That this problem is real is testified to by the following example. Chemistry teachers last year confessed to confusion when preparing for examinations: "Do we believe the gospel according to

(a) the syllabus?

(b) the lecturer's comments in class?

(c) the lecturer's notes?

(d) the assignments?

(e) past examination papers?"

ACCESSIBILITY

Mathematics teachers with the FITMAST project point out that much of

the first year University material is not used in matric teaching. They meet e, ln, cis, for example, for a brief time on the residential course. Then they do not meet the topic again until they bump into it in an assignment later in the year. (Exams even later still is a different story.)

Consequently teachers say they are not at ease to tackle assignment questions. They must refer to lecture notes, textbooks, and if that is often still not enough they must try consultation with colleagues, tutors, lecturers.

Fitmast has chosen the role model of the contact lecturer compressing the ± 165 h of contact time into 5 weeks. Whatever future modifications are made, it is suggested that these should be research-based, thoroughly evaluated, have strong teacher-input and address squarely the question of accessibility.

UNISA'S DOCUMENTATION SECTION

B J van der Walt
Department of Central Services, Unisa

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1. INTRODUCTION

1.1 The paper explosion

For centuries following its introduction into Western society, paper was a scarce and therefore expensive commodity. It was only the mass-production methods introduced by the Industrial Revolution that placed paper - and books - within reach of the masses. The impact of cheap and plentiful paper on the dissemination of knowledge was immense, as were the benefits in other fields of human endeavour. Unfortunately however, yesteryear's boon has turned into today's bane: we are now engulfed by an avalanche of paper. The challenge is no longer to create information, but to control and manage it in order to put it to good use. Already a vast body of intelligence is lost to the world, either because no-one knows that it exists at all, or no-one knows where to find it.

1.2 The situation at Unisa

Owing to the large number of students, the University experiences some problems with the handling, storage and retrieval of an enormous number of documents. Unisa's Documentation Section now holds approximately 130 600 paper-based files and 662 000 microfiche. The combined content of these files and microfiche adds up to several millions of documents. It must be obvious, therefore, that the role of the Documentation Section in records management, in its relation to distance tuition, can hardly be overemphasised.

In the ever-changing field of information management Unisa will have to decide what the role and the future of its Documentation Section are going to be. In essence this future offers two options. One will be in the sophisticated domain of high technology; in this case our manually-operated, paper-based system will have to be largely replaced by an automated system based on a more compact storage medium capable of rapid and accurate retrieval

retrieval and which would approach a paperless administration. The other option is to retain our present storage systems (paper-based and microform), all the while improving our work-methods and procedures to ensure that records can be found quickly, dealt with and returned effectively, and kept no longer than is strictly necessary. A high priority should also be given to better utilisation of expensive floor space.

1.3 Aims of this paper

In this paper we aim, firstly, to set out the composition and the workings of Unisa's Documentation Section, and also the role this Section has to play in the distance tuition process. Secondly we shall look at the advantages and disadvantages of the existing filing system, and thirdly, we shall review the various options we can choose from in order to improve our performance.

1.4 Some definitions

At this point it might be appropriate to define a few of the terms used in this paper:

(a) Records (or information) management: The planning and controlling of records from their creation (or receipt) until their final disposition (i.e. either permanent retention, or destruction after they have served their purpose).

(b) Records: Any medium on which information is placed or stored.

(c) Filing: The physical process of preparing records to be filed and placing them into their proper storage containers. Filing is one of the activities that are part of records management.

(d) A paper file is the well-known, traditional cover made of stiff paper and containing one or more documents pertaining to a specific subject.

(e) Microfilming: Photographic process whereby documents are greatly reduced and transferred onto a photographic film which is then cut up in strips that, collectively, constitute a microfiche.

(f) A microfiche (as used by Unisa) is a rectangle of transparent film, measuring 105 x 148 mm (A6), containing 60 frames, each frame being a highly reduced photograph of a document, and adapted for re-enlargement.

(g) A microform file (in the Unisa context) is a collection of documents recorded on microfiche.

(h) A document is any of a number of information-bearing items ("pieces of paper") that, collectively, constitute a file.

2. UNISA'S DOCUMENTATION SECTION

2.1 Records management

The Documentation Section is part of the Department of Central Services. It is the custodian of most of the University's records and is reponsible for records management. This task is greatly facilitated by the fact that records are centralised.

2.2 Centralisation. The fact that Unisa's records are kept in one central area offers considerable advantages, the most important being:

(a) Uniform work-methods and procedures
(b) uniform services provided to users
(c) fewer duplicates have to be made
(d) equipment purchase can be minimised and equipment utilisation maximised
(e) better utilisation of fewer staff
(f) better co-ordination of activities

(g) easier personnel supervision
(h) easier control over paper flow.

Naturally, a centralised records system is not entirely without disadvantages, the most notable of which is that users in remote locations will inevitably experience delays in obtaining information. However, the pros of centralisation far outweigh its cons.

2.3 Composition of the Documentation Section

The Documentation Section comprises two subdivisions:

2.3.1 The Filing Section where -

(a) all official Unisa correspondence is received, sorted, circulated and filed; and
(b) paper files are stored.

2.3.2 The Microfilm Section where -

(a) documents are microfilmed; and
(b) microfiche are stored.

It should be mentioned, however, that, apart from the records kept in the central records centre, each academic, administrative, professional and technical department, each section, bureau, institute and centre at Unisa has its own records. These, it must be emphasised, are not duplicates of the records kept in the Documentation Section. This highlights the magnitude of the paper glut the University has to contend with.

2.4 Holdings

2.4.1 The Filing Section at present holds the following paper files (numbers approximated):

(a) Student files (94 000 active, 30 000 dormant). These contain the following documents:

- Personal particulars
- application for registration
- school record, including copies of school certificates
- academic (tertiary) record, including copies of degree and diploma certificates
- correspondence between student and Unisa
- miscellaneous.

(b) General files (800) contain documents pertaining to, inter alia:

- Faculties administration
- financial administration and planning
- internal and external audits
- correspondence with external organisations, for instance, other educational institutions and Government departments
- research
- educational technology
- tuition and academic planning
- computer systems
- senate
- acts and statutes.

(c) Joint Matriculation Board (JMB) files (5 800) contain:

- Applications for full or conditional matriculation exemption (e.g. from candidates over the age of 23, and from foreign applicants)
- correspondence between the Board, candidates and various educational institutions both here and abroad.

2.4.1.1 Storage system

Unisa's paper-based files are handled manually. In the distance-tuition situation we are dealing with individual

files (i.e. all documents pertaining to an individual (student) are kept in a single file). Since these files are referred to very frequently and therefore handled a lot, the open-shelf system, whereby files are stored vertically, in numerical order, has proved to be best suited for our purposes. (Although the filing system is a numerical one, it is possible to retrieve certain information alphabetically by means of the computer.)

2.4.1.2 Advantages of paper-based files and open-shelf filing

(a) Paper files. There can be no denying that, in spite of the many disadvantages mentioned below, paper documents (hard copy) present two major advantages.

First, they are immediately available without any kind of processing. This is an important consideration in respect of active student (and other) files that are referred to, and worked with, frequently. Second, users prefer working with paper documents.

(b) Open shelving. Files are visible at a glance and easy to reach. Moreover, open shelves offer easy simultaneous access to several filing clerks.

2.4.1.3 Disadvantages of a paper-based filing system

The main disadvantage of a system consisting of paper files stored in open-shelf cabinets is its high cost. The reasons for this are:

(a) This system requires a large area of expensive floor space.
(b) It is labour-intensive. As our files are handled manually, the Section has to employ a staff of 56.
(c) It is time-consuming. Locating and manually retrieving paper files takes time; more time is needed for refiling.

(d) It is prone to misfiling. Although the incidence of misfiling at Unisa is below the average of 5 - 7 % that experts consider "acceptable" in the case of large organisations, it does occur. Tracing a misfiled file certainly is a major and costly hassle.

(e) It requires continual maintenance. Our paper files are handled a lot. This subjects them to excessive wear and tear and necessitates regular replacement of worn folders.

Other disadvantages (less related to cost) are:

(f) Remote location of users. Unisa's main campus is vast. Moreover, the University owns and occupies two buildings in town (Samuel Pauw and De Doorns). Files are taken by messengers to users who have requested them. The attending time and distance factors subject these highly mobile files to additional risks while en route: loss, theft, tampering, sabotage, unauthorised perusal.

(g) Temporary unavailability of files. It is obvious that, from the moment a paper file is removed from its shelf to be sent to a user until it has been refiled, it is unavailable to other users.

(h) Fire risk. This is not a major issue at Unisa since filing cabinets and storerooms are built of fireproof materials. There is, moreover, an automatic overhead sprinkler system. Yet, the possibility of, for instance, a careless nicotine addict sending a number of our highly combustible paper files up in smoke cannot be discounted entirely.

(i) Fatigue in filing staff. The handling of large quantities of files is physically taxing on female filing clerks.

(j) Low security.

(k) Low confidentiality.

(l) Diminished control over paper and file flow. Since the despatch, destination and return of each borrowed file are duly recorded, the Documentation Section knows at all

times where a particular file is supposed to be. Therefore, should another user wish to borrow that particular file, the Filing Section can request the first borrower to return the file immediately. However, problems can arise when a large batch of files is to be circulated among several users. In such cases it may prove difficult to establish who is in possession of what at any given time.

(m) Lack of physical control over files out on loan. It is obvious that filing staff are unable to exercise any physical control over files that have been temporarily removed from their care.

2.4.1.4 Safety precautions

As all concerned are fully aware of the vulnerability of paper file holdings, every precaution possible is taken to protect them from the above-mentioned hazards. Apart from the sprinkler system that reduces fire risk, premises are kept meticulously clean and free of dust; they are also fumigated at regular intervals. It is, moreover, reassuring to know that, even if the worst comes to the worst, microfiche copies (security copies) of most of the important documents on file in the Filing Section are kept in strongrooms. Therefore, the possibility of all of Unisa's records being irretrievably lost in a major disaster is very remote indeed.

2.4.1.5 General problems encountered

(a) Misclassification. The decision as to where (under which heading, category, discipline) general items - especially correspondence - are to be filed is of prime importance. An item that has been misclassified and therefore misfiled is extremely difficult to retrieve. Misclassification is not a major problem at Unisa, but it does occur occasionally. Its main causes are:

- Differences in personal interpretation
- inaccurate coding on the part of the user
- inability of the user to select an appropriate code number
- insufficient cross-references.

(b) Lack of proper instructions. All documents must be filed according to specific instructions of the user. Failure to provide documents with such instructions obliges the Filing Section to return them to the user. This results in a considerable waste of time and effort.

2.4.2 The Microfilm Section

2.4.2.1 Inception

The problems caused by large numbers of paper files became very obvious in 1972-73 when Unisa personnel and their baggage train removed to the new campus on Muckleneuk Hill. Literally tons upon tons of files cluttered passages, storerooms, strongrooms - even valuable office space. It became obvious that this issue would have to be addressed as a matter of urgency, and in 1974 microfilming was introduced. This process reduced the storage space needed by more than 95 percent and retrieval time to less than one minute. The following figures clearly illustrate the enormous benefits derived from this system: The paper files that have been microfilmed so far would require more than three kilometres of conventional shelf space, whereas the microfiche made from these paper files take up only twelve metres of storage space. The administration and handling of these paper files would require a staff of at least 40, whereas only two employees are needed to administer the microfiche that replace these files, keep them up to date and retrieve any one of them within 50 seconds.

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2.4.2.2 Holdings

The Microfilm Section holds at present approximately 662 000 microfiche.

2.4.2.3 Advantages of microfiche

The main advantage of microfiche is undoubtedly its high storage capacity and a very substantial saving of expensive floor space; it is therefore extremely cost-effective. Other cost-related advantages are:

(a) Low cost per document
(b) cheap, easy and fast reproduction
(c) substantial saving of labour.

Further advantages (less related to cost) are:

(d) Easy replaceability
(e) stability
(f) permanence
(g) easy transportation
(h) high integrity
(i) easy filing
(j) easy and rapid retrieval
(k) resistance to heat, water and other destructive agents
(l) records security
(m) simultaneous access by several users.

2.4.2.4 Disadvantages of microfiche

The main drawback of microfiche is user resistance. Despite the very real threat posed by the accumulation of unmanageable quantities of paper documents, most people still prefer to work with the traditional "piece of paper". They are reluctant to use microfiche. This shying-away from microfiche is probably caused by the laborious procedure:

A microfiche (or a copy thereof) must first be obtained, then loaded into a reading-machine and scanned before the document can be viewed.

3. HOW WILL UNISA MEET FUTURE CHALLENGES?

3.1 Some questions

We should start by asking ourselves a few pertinent questions:

(a) What are our goals?
(b) Do we achieve these goals?
(c) Where do we go from here?

3.1.1 What are our goals?

The goals the Documentation Section is being paid to achieve are to -

(a) ensure, as far as possible, the physical safety and integrity of Unisa's records
(b) keep these records up to date
(c) process and handle information effectively, efficiently and economically
(d) know what exists and where it is to be found
(e) fulfil the requirements of, and render the best possible service to, management and other users
(f) decide which records are to be disposed of and when.

3.1.2 Do we achieve these goals?

Yes - to a very large extent. However, as we stated in the introduction to this paper, we shall have to take cognisance of the fact that now more than ever before, information management finds itself in a state of constant flux and that, consequently, we shall have to decide on what the

Documentation Section's contribution will be to improved goal achievement in the face of increased demands.

3.1.3 Where do we go from here? The options

There are several options, each with its own advantages and drawbacks:

(a) Improved management and optimal utilisation of existing facilities;
(b) upgrading and improvement of the existing system; or
(c) a clean break with the past and a change-over to an entirely new high-tech system.

3.2 Improved management and optimal utilisation of existing facilities

If we decide on this first option, we shall have to pay constant attention to the following:

(a) Continuing planning. This includes the formulation of plans of action for the future with special reference to new methods and procedures in order to -

- improve filing and retrieval efficiency
- save costly office space
- reduce operational costs
- reduce manpower costs by means of regular manpower analyses
- improve user service.

(b) Continuing organising. This includes the systematic arranging of equipment, work areas and work processes.

(c) Continuing directing. This means providing guidance and direction to subordinates in the discharge of the duties assigned to them; bringing the right resources to the right job with the right instructions. Directing also includes the very important aspect of employee training.

(d) The implementation of official policy regarding retention and disposal of records.

3.2.1 Advantages of this option

Since better use will be made of available labour and equipment, savings will result. Moreover, as all concerned are thoroughly familiar with the existing system which, by now, is well established, disruption and other drawbacks attending a change-over will be avoided.

3.2.2 Disadvantages

If we retain the present system - even in an improved form - we shall also retain most of its inherent flaws. These, however, are not unmanageable.

3.3 Upgrading and improvement of the existing system

3.3.1 Upgrading of the paper filing system. Should this second option be chosen, our first priority should be to find a way to modernise our paper filing system.

It is fortunate that the office equipment industry has come up with some ingenious solutions that will go a long way to alleviate the fourfold space-time-labour-cost problem:

(a) Mobile ("roll-away") filing cabinets. This is an interesting proposition that offers a relatively low-cost solution to the major problem of large areas of premium floor space being taken up by conventional fixed filing cabinets. Roll-away cabinets are mounted on a wheeled undercarriage; they run on tracks bolted to the floor, very much like a railway carriage. Consequently provision need be made for only one working-space irrespective of the number of roll-away cabinets in use, as opposed to fixed cabinets which require one working-space between

each pair of them, or between each cabinet and a wall. The sketches below clearly illustrate the different layouts:

A: Fixed filing cabinets

4 double-faced cabinets require 5 working-spaces

B: Roll-away filing cabinets

Only one working-space is needed for 7 double-faced cabinets that take up no more space than the 4 in Sketch A. The filing clerk rolls one cabinet away in order to gain access to another.

(i) Advantages of roll-away cabinets:

- Considerable saving of floor space
- relatively modest purchase price
- retention of the convenient open shelves.

(ii) Disadvantages:

- A certain capital outlay
- minor alterations to the building (if necessary)
- reduced simultaneous access. This, however, is not a factor at Unisa, since only one filing clerk operates a work-station as represented in sketch B above.

A number of roll-away cabinets are already being used satisfactorily at Unisa.

(b) The vertical "carousel" filing system. This is an extremely attractive option. Its main characteristic is that it reaches

upwards instead of expanding horizontally: it utilises the full height of the room that houses it.

(i) Advantages of the carousel system:

- Saving of floor space, labour and time
- retention of open shelves
- effective security: the system can be locked centrally, and an electronic alarm system can be installed
- files are enclosed and therefore kept clean and dust-free
- computer compatibility, which opens new avenues for future upgrading
- reduction in staff fatigue: using this ergonomically designed system results in vastly reduced fatigue in staff, who are relieved of all strenuous tasks. There is no more need for crouching, bending, or scaling ladders: an electrically-driven mechanism brings the shelves to the operator who can remain seated and, by means of a tiny electronic control panel, can retrieve a file within seconds.

(ii) Disadvantages:

- A fairly high purchase price
- some alterations to the building (if necessary).

3.3.2 Upgrading of the microfiche system

As the considerable advantages of microfiche far outweigh the disadvantages, the upgrading of this system deserves looking into. Microfilming and the storage of microfiche, as undertaken at present by Unisa, can be modernised by means of a number of new devices now available, for instance:

(a) The carousel system, as described above, but designed to accommodate microfiche. This would be the most economical option as far as floor-space saving is concerned

(b) a link-up with the computer's main frame, affording management and other users direct access to stored information by means of either a high-resolution terminal screen or a laser printer

(c) computer-assisted retrieval, convertible into fully automated optical-disc retrieval

It should be noted that options (b) and (c) above would necessitate the creation of a whole new computer network, the high cost of which might well outweigh its advantages, especially if paper files - even in reduced numbers - are retained anyway.

3.4 A change-over to high technology: The optical disc

3.4.1 A short description of the optical-disc system

The latest development in the field of office automation and document storage and retrieval is known as "optical storage computer-assisted retrieval", "Oscar" for short. This is a completely integrated electronic system, designed to file written/printed documents through images, thus reducing the use of paper. It adopts completely different, very advanced technologies and is based on the principle of a concentrated light beam scanning the document to be reproduced. The impulses thus received are communicated to a laser beam which burns microscopic holes or "pits" in the surface of a plastic disc. Retrieval takes place by capturing the light reflected by these microscopic pits; these reflections are then transmitted electronically to viewing facilities which are either high- resolution screen video terminals or laser printers. Any document (up to size A2) can be stored in the system's memory through automatic scanning.

The optical-disc technology could make a significant contribution towards the achievement of the paperless office. (It should be noted that "paperless" is only a

manner of speaking: it is doubtful whether there can be such a thing as a 100 percent paperless office.)

3.4.2 Advantages of the optical disc

(a) Huge savings in floor space, time and labour
(b) very high storage capacity: 20 million pages per unit, or 60 000 A4 documents on a single 30 cm disc
(c) easy and rapid retrieval
(d) easy reproduction
(e) automatic document flow
(f) viewing terminals and/or laser printers can be installed exactly where they are needed
(g) simultaneous access by several users
(h) the necessity to retrain staff will result in their becoming more efficient
(i) improved management
(j) no out-of-file conditions: information is always complete
(k) no lost documents.

3.4.3 Disadvantages

(a) A very high capital outlay, not only for the technology itself but for the whole new computer network it requires
(b) the maximum size of documents that can be reproduced is A2
(c) relatively slow input
(d) insufficient feedback from present users
(e) many features still unproven owing to the short time this technology has been on the market, especially in South Africa
(f) total dependence on overseas suppliers and highly-skilled specialist technicians, resulting in the risk of excessive down-time.

4. CONCLUSION

When we have to decide what the future role of the Documentation Section at Unisa will be, there are - as already stated in the introduction to this paper - only two options open to us. One will be in the domain of high technology. The other will be the retention - possibly in an upgraded form - of our existing system. The following considerations will play an important role in the decision process:

(a) Economic factors. With the present economic climate being what it is - and unlikely to improve soon - financial considerations are paramount: the filing system that we shall eventually decide upon will have to be cost-justifiable.

(b) Users' preferences. In all likelihood, Unisa will continue to use a paper-based filing system for a long time to come. The reasons for this are:

(i) The present system works well and is - for the time being - perfectly manageable and under control.

(ii) Paper will continue to play an important role - even in the office of the future. In distance-tuition, such as offered by Unisa, staff deal with frequently-referenced individual student files, and users will probably prefer to work with paper documents.

The upgrading or improvement of the present system is the best solution from a financial point of view.

There is, however, hardly any doubt that the final solutions to the problems attending a paper-based filing system are to be found in the optical-disc system which, in our view, will prove to be the ideal replacement for the time-consuming, labour-intensive information storage and retrieval system we are using at present. Optical-disc technology offers almost total office automatisation and will vastly reduce the use of paper. In view of the unquestionable advantages offered by optical-disc technology, user resistance - if any - is expected to be negligible.

Although the purchase of optical-disc technology is not, at this stage, a feasible proposition, it is very likely that we shall look at it again once technical progress and wider use have caused the price to come down.

INTERACTIVE MULTI-MEDIA LEARNING: A BUSINESS CASE STUDY IN DISTANCE LEARNING

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This paper will define the concept of interactive multi-media learning as an approach which uses the microcomputer as "the hub of a multi-media learning architecture". The approach is largely resource based and uses the concept of mastery learning.

It will address the appropriateness of a variety of media including video, computer based and audio in delivering distance education/training to a potential target market of 23 000 employees drawing upon actual examples within the Standard Bank Group to illustrate the points made. The areas covered will include skills training, computer literacy, the training of D.P. professionals, computer end user training, sales training, management development and the development of interpersonal skills.

Finally, the paper will address the management issues and organisational infrastructure required to support an approach of this nature.

DISTANCE LEARNING : THE SOUTH AFRICAN AIR FORCE EXPERIENCE

Neville Parkins
Air Force Training Command

INTRODUCTION

1. The role of a nation's defence force, and therefore also that of its air force, is to conduct warfare on behalf of its citizens immaterial of colour, political affiliations, age, sex or creed. Warfare is a relative term and it can stretch from peacekeeping operations, to an all out conventional matching of our air force against an aggressor's air power. The important element of warfare however, is that a nation may not lose its war - when a nation loses its war its people lose their culture, values, freedom, privileges and wealth. There is no second chance. Unlike failure in business or in the academic world there is no way back.

2. The South African Air Force of today therefore may not and will not lose any war, it may be committed to - and the reason for this strength lies in the training of its men and women.

3. It is some of the experience which we have gained in this vital training which we would like to share with you during this symposium. In this distinquished academic company we make no pretence of academic powers, we make no attempt at theorising, we make no pretence that we are even correct in what we are doing. Instead I propose to place the practical experiences of a dedicated body of professional airmen before you for what it is worth and for what you may gain therefrom.

4. The modern air force sees itself as a professional group. Our profession however is to conduct warfare and our allied tasks such as flying, technical, logistics, management, leadership and training have also to be carried out professionally. Our trainers are not all academically qualified, very few of them are professionally qualified outside of our organisation.

We have flying instructors who are carrying out highly successful instruction at Mach 2 in a thirty million Rand aircraft who have had no external formal training of any kind - I think that you will grant us the right then to say that we are professional and knowledgeable in what we do.

AIM

5. The aim of this paper therefore is to outline the findings of the South African Air Forces distance learning experience during the past fourteen years.

HISTORICAL BEGINNINGS

6. In its seventy fifth year of existence the SA Defence Force looks back to its establishment just a year after the formation of Union in 1910. The Air Force was formed in 1920, the second autonomous Air Force in the world. Almost from the beginning the training had two characteristics. Firstly it was closely coupled to the Air Forces of Europe, especially Great Britain. Secondly it relied heavily on the calibre of its men to adapt to local conditions and circumstances. Trainingwise these two elements had a telling effect. On one hand the South African Air Force's early members learned to be self sufficient very quickly and herein can be found the first elements of distance learning. Although not formally conducted distance learning, from RAF manuals and RAF courses, it found its origin in the first years of the SA Air Force. On the other hand the reliance on Great Britain for training had the opposite effect on the more abstract and possibly more important training of the SA Air Force officer in subjects such as leadership, top administration, strategy and military thinking. Here as a relatively small Air Force our leaders were sent to British, American and French Officer Academies. Sandhurt, Maxwell, and Cranmere became the cradles of our strategic thinking.

EARLY DISTANCE LEARNING

7. Soon after hostilities ceased at the end of World War 2, the SAAF found itself becoming embroiled in the Korean conflict.

In the fifties therefore a system of technical training known as "Q" classes evolved. Here technical mechanics, radio and radar, electrical and instrumentation technicians underwent a series of trade training in their own time. Using prepared manuals these technicians presented themselves for formal examinations, theoretical as well as practical, at set intervals.

8. No formal measurement of the Q class system has ever been done and it rests today in the memory of many of the old timers who subjectively see it as part of the "good old days". In more recent years the technical man has been absorbed into the technikon and 'school block' concepts and any distance learning which they undergo falls outside of the SAAF's internal training scheme as such.

9. The Officer Development Programme. Later history had a profound influence on the Air Forces training programmes. On leaving the Commonwealth in 1961 the overseas sources, especially of advanced strategic thinking, began to dry up. No longer were the staff courses of the world available to us. We had to start out on our own. In itself this was not a bad thing however. Already Harold MacMillans winds of change were being felt high up in the African skies. Already an African leadership style was emerging. Already the strategies and tactics of a cold, low level short range Europe were being superceeded by the hot and high long range African situation. With no trouble at all the SAAF began its own Officer Development training programme. In the early seventies relations with the West were still good enough for us to test our men against the best of the West and the results proved that we were not lacking in any department.

10. The escalation of the conflict on our borders however caused a significant problem to arise. Officers development courses are of necessity long in duration. (This will be described in detail later.) With the bush war committment, and the relatively small officer corps of the SAAF it started to become extremely difficult to spare officers to attent the long development courses.

11. Distance Learning. In 1974 a programme was launched by the South African Air Force College in Voortrekkerhoogte whereby officer development programmes could be cut in half timewise, without any loss in quality. This new scheme known as the Officer Development Programme (ODP) had as its basis a comprehensive distance learning element. This then was the birth of formal distance learning in the SA Defence Force. Of note is the subject field in which it was launched, namely Officer development.

12. Officer Development. An Air Force cannot be managed, it does not therefore have managers. An Air Force has to led - and this is the task of its officers. Officers are commissioned in writing by the executive head of the State to carry out duties which are an extension of his own executive powers. An officer has legal powers (he is ex officio a justice of the peace), he also has decision making responsibilities to the State. An officer must lead men in situations outside of an office where options of dismissal or cuts in salary are not available for managerial discipline. Officers deal in life and death and they face opponents equally skilled in fighting and leadership.

13. Officership is also a task over and above the man's functional occupation. A man cannot just be an officer - he must also be either a pilot, navigator, logistician, a personnel officer or any of the multitude of classifications found in an air force. He must be the best in his job as well - because men rarely follow an officer who himself is lacking in skills.

14. To carry out the task of officership the man has to be specially selected at every stage of advancement in the organisation. Thereafter he must be trained in leadership, decision making, warfare, communicating in speech and word and in managing people. The officer must know the management processes of planning, organising, controlling and directing. All officers are trainers - because when an air force is not fighting it is training. Because he must make decisions

affecting the whole country the officer must be well versed in the factors influencing the military situation - be they social, political, geographical or economic. The officer must know, according to his level, what the strategies of his air force, his defence force and his government of the day are. He must know what the results of his actions should be - in other words he must work towards a desired, common result. All of this he must understand on a regional, national and international level. In addition to the above skills an officer must have certain personal dimensions. An officer whose integrity is in doubt cannot fulfill the high claims made against him, so integrity, loyalty, respect and patriotism are examples of the personal dimensions which are both taught and evaluated in an officer.

15. Traditionally the courses which develop the SAAF officer into the man just described takes place at intervals extending over a twenty year period. The selection process which takes place on each course is important to note. Not only does a man pass or fail the course academically but on each course an assessment is made of his personal characteristics and this assessment affects his future placement and promotion.

16. Traditionally an officer spends the first ten to twelve years of his career concentrating on his functional or classification role. Pilots fly on a squadron whilst personnel officers may serve as the adjutant on a unit or a base. In this time much informal development takes place. Between the ages of 35 to 40 the officer was traditionally selected for what was called the Staff Course. This was an idea said to have been established by Caesar, but definitely capitalised upon by Napoleon, the Prussian Officers corps and the Army and Navy officers of Queen Victoria. The staff course usually lasts for a year. (Some countries have up to two year staff courses.) In this time the officer leaves his home and lives in the Officers Mess for the duration of the course.

17. It was into this vitally important, highly skilled, abstract

and traditional situation that the Air Force College ventured with its distance learning programme.

INITIAL OFFICER DEVELOPMENT PROGRAMME (ODP)

18. The original ODP of 1974 made vital changes to tradition, these were:

a. The Officer Development Programme would consists of 4 separate structured but supplementry courses spaced at approximately five year intervals culminating in the Senior Command and Staff Course.

b. Half of each course would be conducted by correspondence whilst the member continued with his normal functional tasks.

c. All four development courses would have an individual studies phase to supplement the residential phase.

d. A separate wing of the College would be established to conduct the Correspondence Learning Phase and it would be known as the Individual Studies or IS Wing.

19. The main reason for the ODP was to prepare double the amount of officers in a wholly South African Officer Development System whilst maintaining the quality required in officership. The importance of evaluation of officer potential was to be maintained and unsuccessful officers were to be eliminated during the residential phases or if they failed certain tasks during IS studies period.

STRUCTURE OF THE ODP

20. Several retired senior officers were approached and offered part time positions in the new IS Wing at the SAAF College. The team which was assembled in the early seventies had a wealth of experience and knowledge of officership. This team set to work and produced a comprehensive set of prècis on various subjects for each course. These prècis are still a

major source of information in the SAAF today and copies have been requested by various foreign Air Forces. The SA Police and the Department of Health, amongst others, have at times requested SAAF IS prêcis on the more common subjects such as management, computers etc.

21. The IS Wing or the "Olds and Bolds" as they were soon nicknamed by the Air Force, also developed a system of tasks which the students had to submit during the 47 weeks of the Senior Staff Course IS phase. Traditionally these tasks took the form of an operational setting in which a staff problem had to be solved. The student is expected to analyse the setting and then to solve the problem in the form of a staff paper. This is a highly structured military appreciation written according to strict rules of logic, clarity, brevity and format. The staff paper has then to be submitted in faultless language and spelling and according to the conventions of military service writing. Many a late night has been spent by officers working on the military staff paper. Concurrent with the submission of tasks the officer was expected to work through his 18 to 20 prêcis and to prepare himself for a final IS examination. The student had to score a 60% aggregate in both his tasks and his examination to be accepted into the residential phase of his course. The examinations and tasks demanded a very high standard and served the Air Force well for a decade. Certain good and bad points came out of the initial Officer Development Programme, the good points were:

a. The SAAF was able to reduce the senior staff course residential phase from 36 to 18 weeks, thus two courses could be held per year. The output of officers doubled with no loss in quality of officership. (Performance of the officer at the end of the residential phase has been accurately measured and documented over a long period - thus it was possible to make quality judgements.)

b. New junior courses were designed and introduced into the

programme. This would not have been possible without IS because of the excessive time away from the job which residential courses would have required. (The Junior Officers Administration Course came out at 42 weeks IS and 5 weeks residential, whilst the Junior Command and staff Course consisted of 47 weeks IS and 7 weeks residential.)

c. Officers were able to prepare themselves at their own pace during the IS phase.

d. During the IS phase officers were able to apply and to test their newly gained knowledge in practice. This led to increased retention and motivation. Officers came on to the residential phases well prepared and knowing what to expect.

e. Excellent prêcis were released into the system.

f. The IS Wing became a centre for advice and feedback. A relationship between the young officer and the experienced retired officer was cultivated.

22. There were a few distinct disadvantages however, prominent amongst these were:

a. The tasks are highly sophisticated and complex. Many date back to the RAF and French Staff Colleges. After a few years the tasks became known to the students. Although details were changed the task system had become compromised, unfortunately there are those who exploited the situation even if their integrity was at stake. The use of outside help and old tasks became apparent when students who obtained good marks on the IS phase proved unable to achieve the same standard on residential courses. Fortunately it happened very rarely and appears to have been resorted to by poor students out of desperation. To create new tasks would have needed a full time staff as large and as know-

ledgeable as the whole IS Wing - an unatainable situation.

b. The final entry examination was a multiple choice/True false type of assessment. It was marked using a negative marking system. This proved very unpopular amongst students, especially those whose whole career was affected by these assessments.

c. The IS Wing and the residential wings began to grow apart. The unhappy situation began to arrive whereby a concept of say, logic, in a paper was taught one way by the IS Wing but was questionned by an instructor on the residential course - typical of students whose careers were being assessed, the 'hair splitting' that grew out of this was noted and commented on by the students.

d. The IS prêcis were issued without any form of objectives or guidance. The student was expected to 'know everything' in the books. The attitude of the College was that it was part of the course to sift the important from the less important information.

e. Performance on the residential courses showed little or no correlation with performance on the IS phases. This might be an important point for those present at this conference who have no way of determining job performance of students who have undergone distance learning. The students were adamant as to the reason why the poorer performer on IS usually did better on the residential phase and vice versa. They claimed that the good officer was usually a busy man in his ordinary day to day task. He was used on more and more advanced tasks, he spent more time away from home and he experienced more stress and fatigue than his less competent counterpart. The "champion" usually rushed his IS tasks, had less time for research and did not have facilities or time to "pretty" up the task before submissions. Other officers admitted to completing their tasks during work time and having adequate time to devote

to each task. This was the educational concept of pacing in reverse.

NEW GENERATION ODP

23. In 1984 the SAAF had another look at its Officer Development Programme. World isolation, the changed economic situation and the swing of the warfare concept away from the military victories it had achieved on the borders to the unrest situation nearer home, prompted a complete rethink. The SADF had also invested by exposing a few officers to post graduate and diploma courses in tertiary education at Unisa, the University of Port Elizabeth and RAU. From these arose a course in Instructional Design for senior officers at the SADF College for Educational Technology. By 1984 the SAAF could assemble a formidable team to redesign the SAAF officers development programme.

24. The main findings of this team, plus the excellent results achieved in practice since the introduction of the 'new generation' ODP could be of interest to the reader. The main findings of the team were:

a. The attitude of the student towards officership is more lasting and important than a head full of knowledge, do's and don'ts and rules.

b. The attitude of the student towards his course determines his motivation and 'on course' performance.

25. This swing towards attitude had the following direct consequences:

a. The contents of the new generation courses were revised according to the organisations as well as the students felt and expressed needs. Students played a greater role in determining what they should be taught.

b. The separate IS Wing was closed down and the individual studies are now conducted by the same instructors whom one will deal with on the residential courses. The attitude change brought about by this move is significant.

c. The new generation courses were detailed in terms of objectives, enabling objectives and performance objectives. Unfortunately the military nature of the contents of these syllabi and curriculli make it necessary for them to be restricted and thus they are not available for publication.

d. The prêcis were supplemented by study guides. These guides were made "user friendly". The lay-out of the guides were made open and uncluttered study hints and self tests were included.

e. In designing the new courses, the contents were continually analysed in terms of what attitude, knowledge and skills the student needed to possess. The objectives were then written in terms of these three domains using the structure of verbs suggested by Leslie J. Briggs[1] page 73. In writing the objectives for the course no consideration was made as to what was to be done by correspondence and what was to be handled on the residential courses. The courses were designed as an entity.

f. Experience from the initial ODP taught us that the tasks were not as successfully handled as we had hoped. We came to the conclusion that distance learning was more suited to knowledge learning than to the acquisition of attitudes or skills. The military appreciation and staff paper requires skills and it was decided to drop them from the new generation courses. The new IS course concentrates on the knowledge requirement, whilst the cultivation of skills and attitude are left to the residential courses.

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[1] BRIGGS, Leslie, J., ed. Instructional design: Principles and Applications. Englewood Cliffs, N.J.: Educational Technology publications, 1979. 532 p.

26. The emphasis on attitude has revolutionised the ODP. The following steps have proved most successful:

a. A 'diffusion strategy'[2] or the marketing of the course to higher authority and to students has proved to be essential. A team has visited bases and units with a professionally prepared slide presentation on the ODP. This has had the effect of motivating the IS student, his immediate superior and in some cases it has been shown to the wives of prospective students. The reasons for, subject covered and rationale behind the course is explained in detail.

b. The IS study material has been made user friendly. The student is guided through the body of knowledge using detailed objectives.

c. Where the knowledge or IS objectives fit into the total learning experience in order to arrive at the skills is easily discernable to the residential student because the IS and residential objectives are all listed in one syllabus. In preparing for a lecture to come, a student need only look at the objectives for that lesson and he will see what he has previously learnt on the individual studies phase clearly marked with (IS) next to the objectives. The IS syllabus is thus an extraction from the total course syllabus.

27. Because the writing of a staff paper is difficult and a great deal of practice is required in order to become proficient, students have requested that the tasks remain in the IS syllabus on a non evaluation basis. Students now submit tasks on a voluntary basis. A mark is allocated to show the student the worth of his task, but the mark has no evaluation significance. The instructors mark the task in terms of 'process' rather than 'product'. Copying a task is now foolish because the student has nothing to gain. The busy student gets

2. BRIGGS, Leslie, J., ed. Instructional design: Principles and Applications. Englewood Cliffs, N.J.: Educational Technology publications, 1979. 292 p.

significant feedback for his efforts. The student with excess time uses his own time to develop himself and gains no advantage.

28. The time scale of 47 weeks for the individual studies courses has also fallen away. A student can have as long or as short a lead up to the residential phase as he desires. The abolition of false milestones whereby tasks had to be submitted by pre-set dates has allowed the system to become much more flexible.

29. The career planners and the utilisation officers in the personnel department have also gained by the new system. Previously they had to plan up to 2½ years ahead for attendance by a member of a residential course. Now the system is much more flexible and career planning has become easier and more accurate.

SUMMATIVE EVALUATION

30. There is a catch to the new system however, and that is the revised summative evaluation at the end of the IS phase. No longer is it a soul destroying negative exercise.

31. Students are now subjected to an evaluation process which thoroughly cover the objectives set. On the senior staff course the IS evaluation is coupled to a work and personality orientated assessment centre which is conducted over a 14 day residential period. The results obtained have been excellent so far.

THE LONG STAFF COURSE

32. In recent years the SAAF has caught up on its backlog of officers to be developed. In order to incorporate new programmes in sensitivity training, computer literacy and to accommodate a series of visits to places of economic and strategic interest, as well as a few days of leave in the middle of the course, the senior staff course has been extended to

34 weeks (eight months) residential. Even within the extended course, the Air Force's pleasant experience with IS has caused us to retain the IS phase for the 'knowledge' aspects of the course.

RESULTS

33. The new look IS has become an unqualified success. Our students like it, the organisation welcomes the increased ability of its products, the SAAF College staff welcomes it because now they are able to concentrate on those dimensions of officership which cannot be taught over a distance.

TEXT DESIGN IN DISTANCE EDUCATION: PRINT AND FACILITATING ADULT LEARNING

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Most distance education programmes use printed text in some way. This paper reviews some of the research on printed text in correspondence and self-instructional material, and looks at techniques that can be used to facilitate learning from such material.

DISTANCE EDUCATION IN DEVELOPING COUNTRIES: THE INDIAN SCENE

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The present paper emphasizes the need for many to learn through Distance Education. The 'Open System' of education can be adapted for the teaching of technical subjects without sacrificing standards and quality. It is argued that the cost per student in this system is much less than that of traditional universities, where huge amounts are spent by State Governments.

Short-comings in this innovative system of education, and the difficulties faced by developing countries in general and India in particular, are discussed and ways suggested for the effective implementation of programmes.

DISTANCE EDUCATION AND THE EDUCATOR'S REGIME OF LITERACY

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A critical look at some of the (often hidden) assumptions about what counts for 'literacy' and educated academic discourse in the context of distance education in the South Africa of today.

REVIEW OF THE GOALS, METHODS, ACCOUNTABILITY AND FUTURE PLANNING OF THE DEPARTMENT OF LIBRARY AND INFORMATION SCIENCE OF THE UNIVERSITY OF SOUTH AFRICA

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1 INTRODUCTION

Unisa's Department of Library and Information Science* is the unit with the largest student enrolment in this field in the country. The education offered by the Department is designed to prepare students for entry into a profession, rather than being a purely academic education. The Department therefore has a strong sense of its responsibility to maintain a high academic standard and to present education that should be acceptable to the profession.

The Department believes that continuous adaptation of its courses is necessary to accommodate:

- The changes that accompany the growth of an information society in South Africa;
- The opportunities and challenges that follow from the increasing need for information in the developing sector of the South African population and economy; and from the entry to the library and information profession of growing numbers of people from that sector;

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*Hereafter referred to as "the Department".

- The changing role of the public library in the community and the consequent changing demands made on it;
- The establishment of a stronger theoretical infrastructure for Library and Information Science to advance problem solving in its practice;
- The de-institutionalisation of the library and information profession, i.e. its detachment from its close ties with the library as institution;
- The need for the continuing education of practising and teaching members of the library and information profession so that they can successfully handle and apply new developments (5, p. 1).

Therefore the design and presentation of the curricula and sillabi need to be based on a thorough and profound study of the actualities and knowledge base of the profession - probably more so than was the case in the past.

2 ROLE OF THE PROFESSION

Before South African universities instituted education for librarians, the South African Library Association (SALA) offered training courses for librarians by correspondence. Once the education of librarians by the University of South Africa was well established, SALA handed over its educational responsibilities to Unisa (3, p. 73).

In 1979 SALA published standards for education to the first

professional level (i.e. a four-year Bachelor's degree in Library and Information Science (B Bibl), or a three-year Bachelor's degree plus a one-year post-graduate Higher Diploma in Library and Information Science).

During the years 1984 to 1986 a team of top members of the South African Institute for Librarianship and Information Science (SAILIS, SALA's successor) undertook the evaluation of all the undergraduate teaching programmes in Library and Information Science in South Africa and the National States with a view to their accreditation by SAILIS. SAILIS uses the accreditation in its decision [illegible] granting its professional membership and regards the evaluation procedure as a service by the Institute to society.

A self-study report by each department or school formed part of the material on which the evaluation was based. Preparing the self-study report for the Department at Unisa challenged the staff once again to examine the goals, methods and activities of its educational programme and to pay sharper attention to its planning for the future.

3 GOALS

It is beyond the scope of this paper to discuss curriculum design and the desirability of the statement of goals for educational programmes. The present author accepts the approach to curriculum design postulated by Zaaiman (6) and the approach to the formulation of goals set out by De Bruin (2) and consequently

assumes that educatonal goals or objectives are needed for the orderly development and presentation of educational programmes.

In preparing the self-study report for its evaluation by SAILIS, the Department established an overall objective for the B Bibl programme and supporting objectives for each subject offered towards it in the Department. Objectives were also established for all sub-divisions of the subjects. This was by no means the first time that objectives had been set in the Department, but it was the occasion for a major review of existing objectives.

3.1 Overall objective

The overall objective of the undergraduate education offered by the Department is to form professional workers who have the theoretical knowledge and professional capability that

a) are demanded for the successful execution of duties at the first professional levels of the library and information profession, and

b) serve as basis for the students' ability to carry out more advanced tasks when they have gained the requisite experience, and to undertake post-graduate studies (5, p. 1).

With this in view, syllabi have been developed that inculcate the necessary knowledge, skills and attitude in students, so that they can optimally assert themselves in the fast changing and increasingly more complex professional world. The academic-scientific education envisages the inculcation of a critical-analytical approach to independent problem solving, as well as an

urge towards independent study and self-development. A balance is maintained between general and specialised subject knowledge, but even the specialised education is aimed at the formation of a general practitioner who can easily adapt in practice on the basis of insights gained, e.g. the basic principles on which his professional work is founded (5, p. 56).

To attain the stated overall objective, certain areas have over the years been identified by the academic staff of the Department in consultation with colleagues in practice, in which undergraduate students need to be instructed and guided to develop their own view of the profession. In order to sub-divide the areas to be covered into manageable sections, the Department identified four basic components, viz

- the book as object of study as it appears in all its physical forms, but particularly as medium for the preservation of information and as bearer of culture;
- the reader or user of the information;
- the content of the book or other medium, i.e. the information preserved and kept available in it for tranfer; and
- the profession which encompasses the activities carried out in an organised manner around the first three elements, and usually identified as the library and information profession.

Accordingly the Department has sub-divided the area to be

covered into the following courses taught at undergraduate level:

Library Science, dealing with the profession;

Information Science, dealing with the information; and

Library Media and User Studies, dealing with the information bearing media and with their users.

A candidate for the four-year B Bibl needs to complete 12 year-courses, of which eight are taken within the Department and four in other Departments. The eight professional courses are Library Science I, II and III, Information Science I, II and III and Library Media and User Studies I and II. In addition the candidate has to complete three years' study of any academic subject outside the Department and one year's study of another academic subject.

The objectives set for the various courses will now be listed.

3.2 Objectives of the courses in Library Science

The overall objective aimed at with the sequence Library Science I to III, is 'to provide the future professional with the basis of knowledge and skills needed for coping with a managerial role and for understanding the nature of the library as organization' (5, p. 41).

This objective is supported by the objectives of the three courses. Library Science I is regarded as fundamental to the structure of the B Bibl in that it provides an introduction to the field of study and to the study of the organisational aspect of library and information work. Its objective is to provide the

student with an understanding of the library and information service system of South Africa, including types of libraries and information services, the structures for co-operation, the social context and certain professional aspects.

Library Science II is intended to provide the student with the background in general management theory that he will need to understand the library and information service agency as an organisation for professional service. It is further intended to identify for the student certain key issues in the organisational context of library and information service and to examine these issues in the light of currently available theory.

The goal of Library Science III, paper 1, is to provide the student with the theoretical basis for understanding interpersonal interaction, and the interaction between the professional worker and the library service organisation as a basis for the development of leadership skills. Paper 2 is intended to provide a theoretical background in research method and practice, to enable the candidate to understand the research process and act as information retrieval partner in the research process. Paper 3 has as its goal to enable students to consider service issues arising in one of 4 types of libraries and information services, viz public, national, university and special. The goal of paper 4 is to provide the candidate with an insight into advanced managerial issues and with managerial theory relevant to specific aspects of library and information services management.

Candidates may elect to study for either paper 3 or paper 4 (5, p. 41-42).

3.3 Objectives of the courses in Information Science

The overall objective of the courses Information Science I to III is 'to produce a professional worker who has theoretical and practical knowledge of the creation, acquisition, storage, retrieval, provision and use of information. The level and nature of education must enable the person to act with self-reliance in information work, and to proceed with advanced study (5, p. 26).

Again the objectives of the sub-divisions support the overall objective. The goal of Information Science I is to introduce the candidate to the field to be studied and to complete the study of reference work and reference sources at a level which will enable the person to apply the knowledge in a practical working situation.

The goal of Information Science II is to produce a person who has mastered the theory and practice of macro-analytic information storage (i.e. classification and cataloguing) to the extent that s/he can execute the normal tasks pertaining to this type of work under supervision in libraries and information services.

Information Science III is intended to produce a person who has mastered micro-analytic information storage and retrieval, and who is familiar enough with the analysis, design and evaluation of information systems to be able to apply the knowledge in a

practical situation. A further goal is to produce a person who has gained a fundamental knowledge of the information infrastructure in general and of the information infrastructure of a particular discipline to enable him or her to provide a specialised information service.

3.4 Objectives of the courses in Library Media and User Studies

As indicated earlier, this subject has two vertical sub-divisions, one dealing with the media that contain information, and the other dealing with the users of information. Joining them under an umbrella title was necessitated by the constraints of professional educational standards and university policy. These demanded that no more than two-thirds of the courses constituting the B Bibl degree should be taught in the home Department. The content of the professional component of the degree therefore had to be limited to the essentials that could be fitted into the space available.

The aim of Media Studies is to provide a basis for the detailed study of the record and to acquaint the candidate with the numerous information-bearing media, their advantages and disadvantages, and how their use may be encouraged in suitable situations. A further goal is to develop in the candidate a consciousness of the speed of technological innovation, the merging of technologies, the definitive role played in society by information technology, and how it influences library and

information services and other similar institutions.

The overall goal of the sub-division User Studies is to furnish the candidate with the theoretical knowledge of the user of information to enable him in accordance with user needs to solve problems and arrive at decisions on the planning of buildings, facilities, the rendering of services and the establishment of policy on the building of collections. A further goal is to enable the candidate to provide user guidance in a professional and responsible fashion and to function as an effective selector of information bearing materials.

3.5 Comment on goals

These objectives are no different for a distance-education situation than they would be for a unit educating library and information workers at a residential university. The product that needs to be delivered, is the same. In a recent article on the educational objectives and curriculum design of an undergraduate course in Library and Information Science at the Polytechnic of North London, McGarry (4) indicates a similar objective to the one arrived at by the Department. This is remarkable, because of the lack of agreement on what should be taught in such courses. McGarry comments: '... no one is exactly sure as to the kind of person we ought to produce; indeed practitioners, if asked, will give many and varied answers -- none of them particularly helpful' (4, p. 186).

4 METHODS

The methods of tuition used by the Department are mainly based on conventional correspondence.

Study guides are used in the place of the oral lectures given in the residential situation. A study guide normally stands for three years and is then replaced by a revised or entirely rewritten study guide.

For most papers one or more prescribed book is used in conjunction with the study guide. Reference is often made from the study guide to the prescribed book, and the study guide may contain explanations of sections or guidance on the interpretation of parts of the prescribed book. However, it is difficult to find textbooks that exactly match the needs of the Department's courses, particularly since the available books are oriented towards the USA, Britain and Europe and tend to assume situations that are foreign to the South African situation, with its mixture of developed and developing economy. At present two textbooks for use at first-year level, initiated by members of the Department and in the production of which they have collaborated, are at different stages of preparation in an effort at overcoming the problems experienced with foreign textbooks.

Tutorial letters containing instructions on methods of study, topics of assignments, prescribed and recommended literature and feedback on assignments received, are sent to students at intervals during a period of study. Tutorial letters are

rewritten or edited every year and are less formal in style than study guides.

Since a Unisa survey established that all students have access to apparatus for listening to them, audiotapes are used for various purposes. In some courses an audiotape with an introductory talk is supplied with the first tutorial materials sent to a student. In Information Science I, an audiotape is used to illustrate how a reference interview is conducted. A set of 40 colour slides illustrating various reference works they need to learn about is also sent to students in Information Science I.

Tape-slide programmes, videotapes and transparencies are used during discussion classes, when students are physically present.

Practical instruction in the cataloguing, classification, indexing and abstracting of information bearing materials is given in writing. The method of instruction in cataloguing and classification is dealt with in a paper given by Mrs van der Merwe in another session of this conference. In this area wider availability of electronic equipment may make it possible for tutors to offer hands-on instruction in putting catalogue information directly into electronic data bases.

In the course Information Science III, instruction is given in the writing of an abstract of a periodical article, in indexing according to postcoordinate principles and in the development of a thesaurus. This is done through the medium of the study guide and tutorial letters for the course and tested by means of two

assignments, at least one of which has to be completed successfully for the student to receive admission to the examination. In the examination a compulsory question is set on the practical component of the year's work.

Thus far electronic media such as home television and personal computers are not being used, as too few students as yet have access to them. The possibilities of these media are being studied for application as soon as the costs and availability to students justify their use. At present it must be borne in mind that a significant percentage of our students live in places where electricity has not yet been installed.

It is envisaged that instruction in the practical aspects of on-line information retrieval by means of computer will be given in the Department beginning with 1987. A suitable personal computer and programmes have been purchased and are being used by tutors to practise conducting information searches in foreign and local data bases. Initially it is planned to provide the instruction to students who can visit Unisa's main campus. Later practical instruction will be extended to other Unisa offices. This is an area where it is hoped that instruction may eventually be taken to students in their homes, as the required electronic equipment becomes more generally available to them.

Students are required to do field work in an approved library for a minimum of four weeks in connection with Library Science III, paper 1. How this is handled, is discussed in another paper

given at this conference by Mrs Thomas.

5 ACCOUNTABILITY

In connection with the Department's work, accountability has three aspects, viz accountability by the Department to society and to its students, and by the students to the Department.

5.1 The Department to society

This year it is twenty-five years since the University of South Africa, in 1962, took over the correspondence courses for librarians previously offered by the South African Library Association (3, p. 73). In doing so, Unisa has placed itself and the Department in a position of peculiar responsibility and therefore accountability to the library and information profession of the country. It is accountable to society for providing it with librarians and information workers who have received a good quality professional and academic education and in whom a desirable service ethic has been inculcated. In the residential educational situation heavy reliance is normally placed on personal example to bring home to students the desired attitudes and ethical standards. To do this by distance education is not easy, particularly since Unisa at present still teaches mainly by correspondence, and does not compell students to attend discussion classes. We can only trust that the practising librarians and information workers our students meet while doing their field work and at their places of employment provide them with good examples

of the desirable attitudes.

5.2 The Department to its students

The Department is accountable to its students for preparing them to cope with the duties of a professional library or information worker. To do this, the Department has to adapt its curricula to the changing information environment. This adaptation has to move fast enough to prepare students to cope with the demands of the developed sector of the economy of South Africa, which in many respects exhibits the characteristics of an information economy: applying the latest information technology in the implementation of networks such as the South African Bibliogaphic and Information Network (SABINET), making daily use of information contained in electronically accessed data bases and regarding devices such as electronic mail as a matter of course.

On the other hand the adaptation of curricula must not outrun the different pace of the developing sector of the economy. This sector makes entirely different demands on library and information workers.

One of our Black colleagues working in a rural environment, recently described herself as a "barefoot librarian" in reference to the "barefoot doctors" used in China to bring medical treatment and health education to the rural population. In a book of which the writer of this has only read a review, Anuar expresses her concern for the paucity of library services to the general public in South East Asia and argues that there is a need to

develop a corps of "barefoot librarians", who should provide basic library and information services and at the same time determine the real needs of the people with whom they come into contact (1). This approach to the rendering of library and information services appears to be applicable to the South African developing communities. Whether the responsibility to educate people for the role of "barefoot librarians" lies with the universities, or whether another agency should be employed, is a question that needs to be examined.

Rural public library services in this country can do much to assist the development of small businesses by providing them with the right type of information, e.g. on municipal regulations; they can provide community information to assist people to cope with the fast changing demands of everyday life; they can support literacy programmes and they can assist the newly literate to reinforce their newly acquired reading skill rather than lose it through lack of use. For some of these tasks professional library and information workers are ideally suited. For others, such as literacy training, other skills are needed, and perhaps a close co-operation between library services and organisations active in the promotion of literacy would be a more sensible approach than actually using the library and information staff in this respect.

A research project is at present being carried out within the Department on the use of libraries for the development of South

Africa. Part of the project is to determine the needs of the communities and part is to determine the information dissemination needs of agencies that have useful information to impart. The results of this project may have far-reaching implications for teaching by the Department.

5.3 The students

At the end of the academic year the students of the Department are called to account for the educational experiences to which they were exposed. Because of their geographically wide dispersal, written examination has thus far been the method of assessment used for all students up to the Honours Bachelor's level. Methods have been devised for the written testing of practical skills, such as those used in cataloguing, classification, abstacting and indexing.

Since interpersonal relations form an important part of the work of librarians and information workers, other means of assessment than written examinations need to be included. The brief period of field work is a possible opportunity for the assessment of students' handling of interpersonal relations, but comment on this aspect is not at present required from supervisors reporting on students' performance.

6 THE FUTURE

The Department sees its role as that of a leader in the field of Library and Information Science in this country. To maintain

such a position, it has to innovate to keep up with developments in information technology and with the changing needs of various communities. The Department needs to innovate as fast as it is permitted by the constraints of University policy and regulations and those of educating at a distance.

Some of the factors to be considered, are the fact that the field of library and information science has over the past 10 to 15 years been widening its scope to encompass a whole constellation of related occupations, many quite new. An example is the burgeoning occupation of Information Manager, on the responsibility for whose education finality has not been reached.

The library and information profession is faced with the major problem of defining the limits of its area of competence and accountability. By virtue of the special qualifications and interests of its staff, the Department has a role to play in this respect.

At the request of SAILIS, the Human Sciences Research Council's Unit for Library and Information Research is carrying out an investigation into curriculum development to provide guidelines for all the teaching programmes in Library and Information Science in the country. The results of the investigation are expected later this year and are awaited with great interest, as they may determine future directions for the Department of Library and Information Science at Unisa.

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